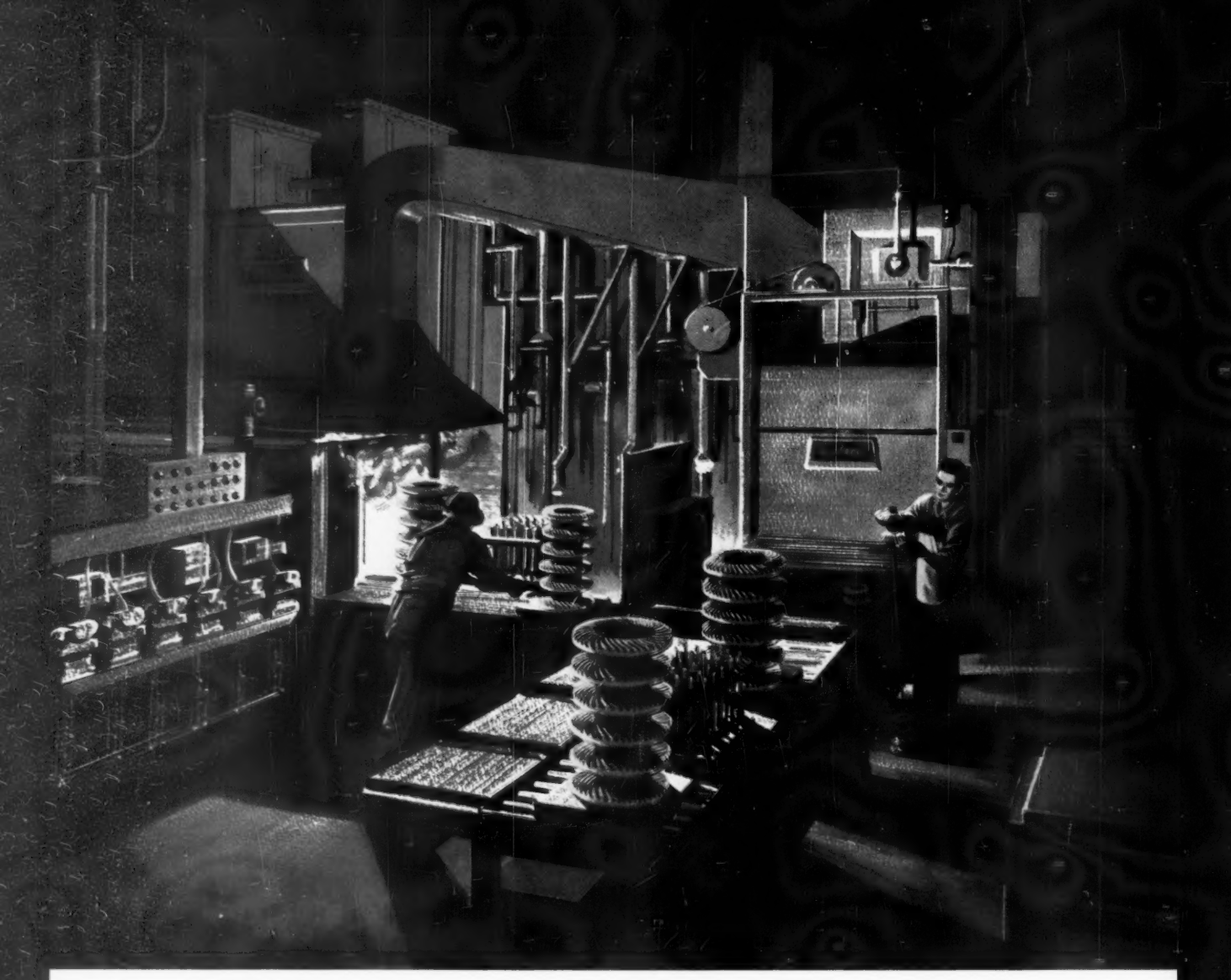
STEEL
The Metalworking Weekly
A PENTON PUBLICATION
JANUARY 23, 1961

W. H. Goldbach (left), W. S. Johnston of Thompson's Jet Div. tell . . .

How to Team Up to Cut Costs . . . 52

How the New Budget Stacks Up 21
Get More from Your Sales Reps 32
New Diffusion Method Bonds Copper . . 55

METALWORKING WEEK—PAGE 11
COMPLETE CONTENTS—PAGE 13



NEW GIANT AT WORK on Double Diamond Gears

This huge, continuous, carburizing, hardening and draw furnace now permits even greater instrument control in heat treating DOUBLE DIAMONDS for maximum wear resistance and load-carrying capacity. So far as we can discover no more efficient furnace could be installed to achieve the quality characteristics our gear customers have come to expect.

At your request, our gear engineers would be pleased to describe this process in greater detail and to explain, as well, what our recently expanded facilities can mean in terms of this pledge: "DOUBLE DIAMOND Gears offer the advantages of lower installed cost and economical and dependable service on the job . . . gears that do credit to your product and reputation."

EATON

AUTOMOTIVE GEAR DIVISION
MANUFACTURING COMPANY
RICHMOND, INDIANA

GEARS FOR AUTOMOTIVE, FARM EQUIPMENT AND GENERAL INDUSTRIAL APPLICATIONS
GEAR-MAKERS TO LEADING MANUFACTURERS

KNOW YOUR ALLOY STEELS . . .

This is one of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many who may find it useful to review fundamentals from time to time.

When Should Alloy Steels Be Ordered to Hardenability?

What is hardenability and how does it differ in carbon and alloy steels?

Hardenability can be defined as the capacity of steel to develop a desired degree of hardness, usually measured in depth. It is produced by special heating and cooling. Carbon steel, except in small sections, will normally harden to a depth slightly below its surface, while alloy steel can, under certain conditions, harden uniformly through its entire cross-section.

Surface hardness obtainable after quenching is largely a function of the carbon content of the steel. Depth hardness, on the other hand, is the result of alloying elements and grain size, in addition to the carbon present in the steel.

In general, where hardenability is the prime consideration, it is not too important which alloy steel is used, just so long as there is sufficient carbon present to give the prescribed hardness, and there are enough alloying elements to quench out the section. It is not considered good practice to alloy a small section excessively, since excessive use of alloying elements adds little to the properties and can, in some instances, induce susceptibility to quenching cracks.

There are, of course, numerous cases where factors other than hardenability must be considered; such factors as low-temperature impact, heavy shock, creep-resistance, and the ability to resist temper brittleness. Through-hardening, therefore, is not always desirable. For example, shallow hardening is often necessary in shock applications, because a moderately soft core is essential.

This series of alloy steel advertisements is now available as a compact booklet, "Quick Facts about Alloy Steels." If you would like a free copy, please address your request to Publications Department, Bethlehem Steel Company, Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Sales: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

New steels are born at Armco
Strong, hard, precision tube fittings
Ultra-strong jet engine mounts

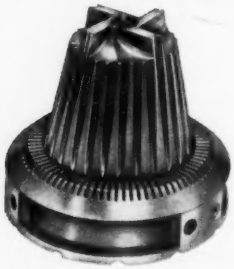
Make harder, stronger corrosion-resisting parts at low cost with Armco 17-4 PH Stainless Steel

Use Armco 17-4 PH to give shafts, valves, fasteners and other critical parts this outstanding combination of properties:

High strengths. Up to 200,000 psi ultimate tensile strength; 180,000 psi yield strength. Good impact strength over a wide range of temperatures. High endurance limit and fatigue strength. **Corrosion resistance** comparable to Type 304 in many media. **High hardness** to solve wear, abrasion and corrosion-erosion problems. Good resistance to galling and seizing. Excellent mechanical properties to 900 F. Resistance to stress-corrosion cracking. **Cost-saving fabrication.** Short-time, low-temperature heat treatment permits finish-fabrication *first*. No distortion, no scaling, no cracking in hardening. Machinable 17-4 PH can also be upset, forged, swaged and welded.

Get full data

Complete data on 17-4 PH properties and fabrication will show where this unique special stainless may pay off for *you*. Call your nearest Armco Sales Office, your Armco Stainless Distributor, or fill in and mail the coupon.



Corrosion and wear-resisting homogenizer rotor

ARMCO DIVISION
Armco Steel Corporation
1011 Curtis Street, Middletown, Ohio

SEND catalog on Armco 17-4 PH Stainless Steel.

Name _____ Title _____

Firm _____

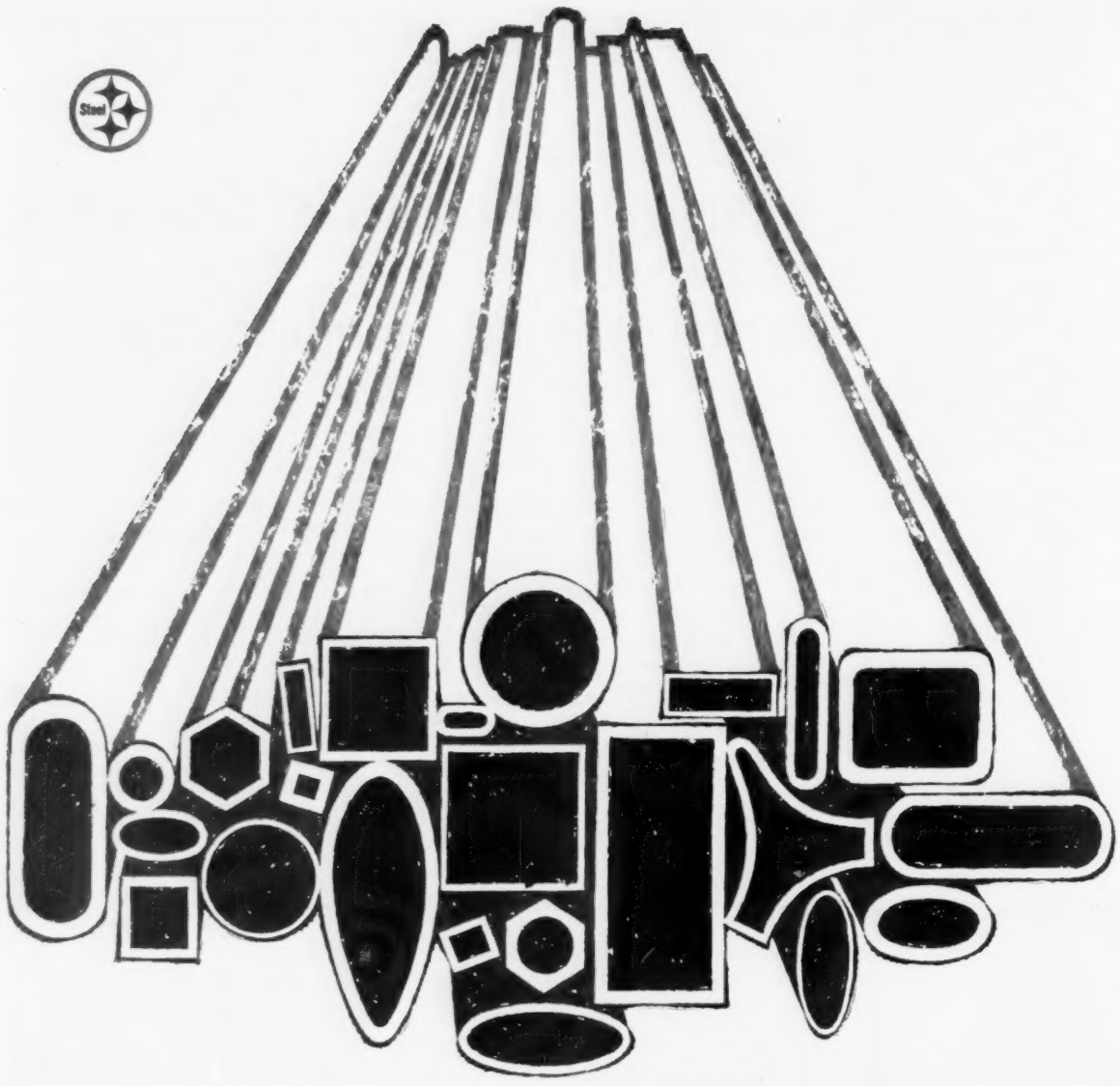
Street _____

City _____ Zone _____ State _____

Stainless Steel

This symbol on your products tells customers you use modern, long-lasting stainless steel.

ARMCO **Armco Division**



DESIGN WITH SAFETY...IN ALL SHAPES AND SIZES!

Armco Steel Corp.§
The Babcock & Wilcox Co., Tubular Products Div.§‡
The Carpenter Steel Co., Alloy Tube Div.‡
Clayton Mark & Co.§
Jones & Laughlin Steel Corp., Electricweld Tube Div.§
National Tube Div., United States Steel Corp.§
Ohio Seamless Tube Div., Copperweld Steel Co.§
Republic Steel Corp., Steel and Tubes Div.§‡
Revere Copper & Brass Inc., Rome Mfg. Co. Div.§‡
Sawhill Tubular Products, Inc.§‡
Southeastern Metals Co.§
The Standard Tube Co.§‡
Standard Tube and T. I. Ltd., (Canada)§
Superior Tube Co.‡
Trent Tube Co., Subs. Crucible Steel Co. of America‡
Union Steel Corp.‡
Van Huffel Tube Corp.§
Wall Tube & Metal Products Co.‡

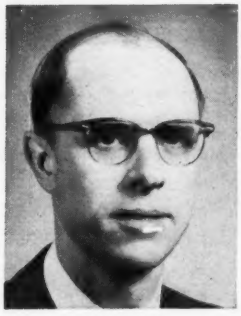
‡PRODUCES STAINLESS STEEL TUBE
§PRODUCES CARBON STEEL TUBE

Regardless of the shape or size, when you specify domestically-produced welded steel tubing, you are assuring uniformity. Wall thicknesses are uniform, concentricity exact. In a rotating part, the result is a better, safer, vibration-free operation. In other applications, the welded steel tube gives you the same design strength as bar stock, with less weight.

The quality producers at left are prepared to help you design with tubing in all weldable grades of carbon, stainless steel and other alloys. You can get useful information from any of them or by writing Dept. ST-1, Welded Steel Tube Institute, Inc., Hanna Building, Cleveland 15, Ohio. It will pay both you and your customers — in uniformity, safety, and savings in weight.

WELDED STEEL TUBE INSTITUTE, INC.

Poles Apart



The two gentlemen pictured here were at opposite ends of the thermometer earlier this month, even though they were covering related subjects. Associate Managing Editor Vance Bell (left) was in subzero temperatures at Duluth while covering an iron ore mining conference. Market Editor Bill Rooney journeyed to Miami Beach, Fla., at the same time to delve into another aspect of metallics at a meeting of the Institute of Scrap Iron & Steel Inc.

International

The learned personnel around here can usually cope with correspondence in any language, but one epistle STEEL received had everyone stumped for days.

At first glance, it appeared to be written in Italian, but it also contained French and Latin words, plus others of an unknown tongue.

One of our linguistic experts, Pat Dwyer, thought he solved the riddle. The letter was written in Tuscan, a dialect still used in northern Italy.

He translates (in part) as follows:

"Oh, the pleasure and the need, most remarkable magazine of The Penton Publishing Co. (illustrated), to subscribe me to your publication. I need the ideas, new techniques, patents etc. (illustrated) which you unfold."

Banquet Circuit

The next voice you hear may belong to one of our editors. In the last month, they have exercised their larynges (a plural of larynx, in case you were wondering) before such varied listeners as marketing men, Kiwanis Club members, and journalism freshmen in college.

Editor Walt Campbell talked about the problems of foreign competition before a marketing group in Rochester, N. Y. Associate Managing Editor John Morgan sounded similar warnings to a Cleveland Kiwanis Club. Machine Tool Editor Bob Huber discussed career opportunities in business journalism with Western Reserve University students.

We'll Keep You Posted

STEEL will continue to keep you posted on the current weekly production pace of the steel industry, even though American Iron & Steel Institute will be a week less current in its reports than it has been.

So that we can continue to provide readers with an up-to-date gage of national steel production, the district editors and correspondents will use their news gathering abilities to keep abreast of steelmaking activities in their areas. They will channel their information into the main office at Cleveland where a national production figure will be computed and charted for you. Not only will STEEL keep you current, as usual, but the editors will give you clues as to what steel production will be in the weeks ahead.

Stand by for Action

Right now, Don Postma, our man in Detroit, is gathering preliminary figures on U. S. passenger car production in 1960. The tally will determine who will win two weeks of wheeling around in any one of the Ford Div. cars as first prize in our 1960 Beat-the-Experts contest. The five next-best-guessers will get right handsome color prints of a dream car rendered by Virgil M. Exner, Chrysler Corp. vice president and director of styling.

We'll run the results in a few weeks.

Time's Running Out . . .

. . . to enter STEEL's Usership Idea of the Month Contest. Deadline for the final contest (December) is Feb. 1, 1961. For rules, see Servicenter, Pages 5 and 6, in any December issue. You might win $1000.

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

WARD

For Countless Uses

of

SPRING STEEL

AMERICA'S LEADING SUPPLIER

Where

SERVICE and QUALITY

is the rule

WARD STEEL CO.

Boston—Cambridge, Mass.

Chicago, Ill.—Greensboro, N. C.

LUCKY LUCY?

No! No rabbit's foot for her. She knows many cancers can be cured if found in time—so she gets a health checkup every year. She also knows contributions can help conquer cancer—so she gives generously to the American Cancer Society. Send your gift to "Cancer," in care of your local post office.

AMERICAN CANCER SOCIETY

STEEL
The Metalworking Weekly

Editor-in-Chief, IRWIN H. SUCH

Editor, WALTER J. CAMPBELL

Associate Managing Editors, VANCE BELL, JOHN S. MORGAN

WILLIAM E. DEAN .....News Editor
WILLIAM M. ROONEY .....Market Editor
ROBERT F. HUBER .....Machine Tool Editor
EDWARD N. CASE .....Metallurgical Editor
HARRY CHANDLER .....Copy Editor
GLENN W. DIETRICH ..Associate Copy Editor
FRANK R. BRIGGS .....Associate Editor
ROBERT O. JAYNES .....Associate Editor
ROSS WHITEHEAD .....Associate Editor

GEORGE J. HOWICK .....Associate Editor
NEIL C. ROBERTS .....Associate Editor
DONALD E. HAMMERSTROM..Associate Editor
DERRY EYNON .....Assistant Editor
JOHN TERESKO .....Assistant Editor
ALFRED M. CASTELNAU .....Assistant Editor
MARY T. BORGERHOFF .....Assistant Editor
EILEEN CORTES .....Assistant Editor
MARY ANN STUVE .....Editorial Assistant

SUE MOORE, Editorial Assistant

THOMAS H. BRYAN, TOM WELSH, Art Editors

IRENE KASNER, Editorial Service

Resident Editors

New York 17 .....60 E. 42nd St.
B. K. PRICE, L. E. BROWNE
BRIAN WILSON, REED TRASK
Murray Hill 2-2581

Chicago 11 .....520 N. Michigan Ave.
ERLE F. ROSS, AUSTIN E. BRANT
Whitehall 4-1234

Pittsburgh 19 .....2837 Koppers Bldg.
WILLIAM V. WALLACE—Atlantic 1-3211

Detroit 35 .....15800 W. McNichols Rd.
A. DONALD POSTMA—Broadway 3-8150

Washington 4 ....1123 National Press Bldg.
JOHN R. BOTZUM—Executive 3-6849

Editorial Correspondents

Buffalo—Emerson 5385 ....GEORGE E. TOLES
Youngstown—Riverside 7-1471..GEO. R. REISS
Cincinnati—Beechmont 1-9607...DICK HAVLIN
Birmingham—Fairfax 3-5381..IRVING BEIMAN
St. Louis—Garfield 1-1212 HAMILTON THORNTON
Houston—Republic 4-5766 ..LOUIE E. MATHIS

Los Angeles—Webster 5-1234..NORMAN LYNN
San Francisco—Exbrook 7-5700 EDWIN HAVERTY
Seattle—Melrose 2-1895 .....R. C. HILL
Toronto, Canada—Oxford 4-6755..F. S. TOBIN
Birmingham, England .....J. A. HORTON
Brussels, Belgium .....PAUL DE KEYSER

Dusseldorf, Germany, DR. HERBERT GROSS

BUSINESS STAFF

Business Manager, S. F. MARINO

Advertising Director ....C. A. TALLINGER JR.
Advertising Service Mgr. ...DORIS MITCHELL
Production Manager .....A. V. ANDERSON
Promotion Manager ....THOMAS J. HARMON
Classified Advertising .....EVELYN DIETZ

Market Research Mgr. ....T. M. BALLANTINE
Circulation Director .....J. C. GERNHARD
Circulation Manager .....P. B. KEEFE
Distribution Manager .....G. R. EBERSOLE
Reprints .....JUNE SCHILENS

Advertising Representatives

New York 17 .....60 E. 42nd St.
K. A. ZOLLNER, GUY LABAW
Murray Hill 2-2581

Wynnewood, Pa. (Phila.) 200 Wynnewood Ave.
WM. J. VERSCHOOR—Midway 2-6512

Farmington, Conn. .....12 Farmstead Lane
CALVIN FISHER JR.
Orchard 7-1756

E. Rochester, N. Y. .....217 Ridgeview Dr.
HAROLD A. DENNIS—Browning 1-2105

Pittsburgh 19 .....2837 Koppers Bldg.
JOHN E. MacARTHUR—Atlantic 1-3211

Cleveland 13 .....Penton Bldg.
J. K. GILLAM, N. W. MANNING
JOHN B. KELLY
Main 1-8260

Cincinnati 6 .....2215 Victory Parkway
E. L. FRANKE—Parkway 1-0711

Detroit 35 .....15800 W. McNichols Rd.
DONALD C. HYDE
Broadway 3-8150

Chicago 11 .....520 N. Michigan Ave.
W. L. POLAND, WM. J. D'ALEXANDER
RICHARD BIRDSONG
Whitehall 4-1234

Los Angeles 36 .....5943 W. Colgate Ave.
F. J. FULLER—Webster 1-6865

San Francisco 4 .....57 Post St.
Robert W. Walker Co.—Sutter 1-5568

Birmingham 9 .....249 La Prado Place
FRED J. ALLEN—Tremont 1-8598

Clearwater, Fla. .....1954 Jeffords Dr.
H. G. ROWLAND—(Clearwater) 31-4121

Dallas 35 .....818 Exchange Bank Bldg.
JAMES H. CASH—Fleetwood 1-4523

BPA

NBP

Published Every Monday by
THE PENTON PUBLISHING CO., Penton Bldg., Cleveland 13, Ohio
MAin 1-8260

GEORGE O. HAYS .....Chairman
RUSSELL C. JAENKE .....President
FRANK G. STEINEBACH .....Vice Pres. and Secretary
FRANK O. RICE .....Vice President
JOSEPH P. LIPKA .....Vice Pres. and Treasurer
DAVID C. KIEFER .....Vice Pres.—Marketing

Also Publisher of
FOUNDRY, MACHINE DESIGN, NEW EQUIPMENT DIGEST, AUTOMATION
Member of Business Publications Audit of Circulation Inc., Society of Business Magazine Editors, and National Business Publications Inc.

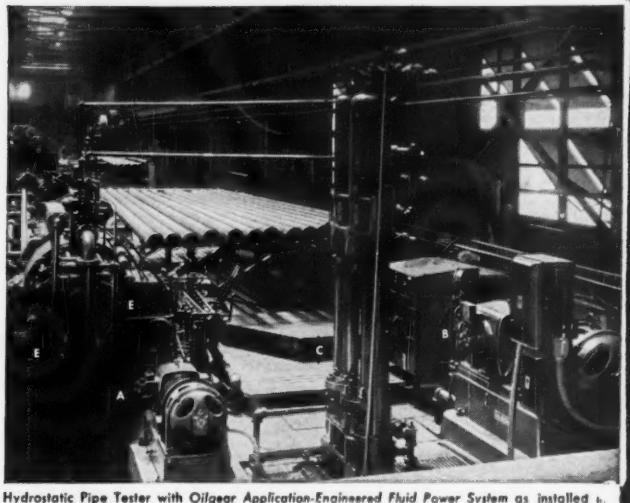
...Fluid Power news

OILGEAR 40 Years of Fluid Power

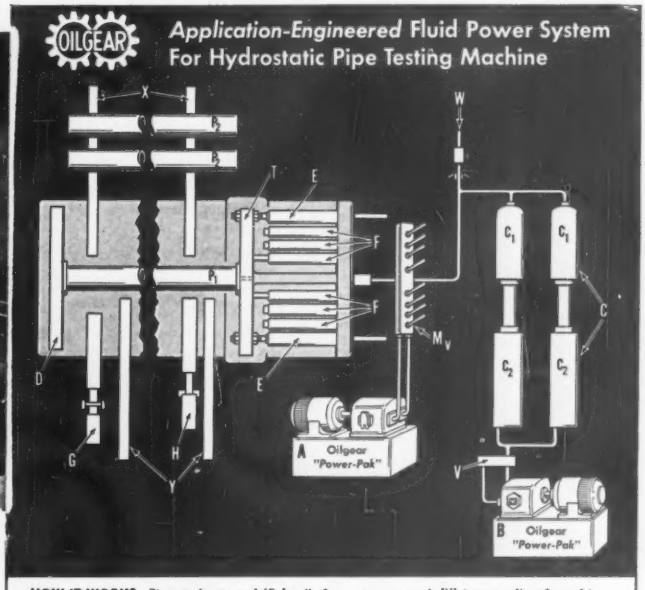
From Oilgear *Application-Engineering* Files

HOW OILGEAR SYSTEM POWERS PIPE TESTER EFFICIENTLY AFTER 23 TROUBLE-FREE YEARS

DATA: To supply power and control system for five functions of a hydrostatic pipe testing machine designed for a wide variety of pipe sizes and testing pressures ranging up to 6000 psi. Linear drives and controls were needed to: *1.* Actuate jaw-type clamps to hold and prevent pipe from buckling. *2.* Traverse testing head rapidly to and from testing position. *3.* Hold testing head against pipe under testing pressures. *4.* Actuate "knockout" arms to eject tested pipe from machine. *5.* Actuate an intensifier to boost water used for testing from city pressure to any selected testing pressure up to 6000 psi. *Specific Operating Requirements:* Simple, safe, dependable; capable of continuous, 'round-the-clock operation, 6 days per week in highly humid atmosphere; cycle rapidly for economical production; require a minimum of maintenance to prevent costly, line-stopping downtime; must be compact to conserve valuable floor space, economical in the use of electrical power.



Hydrostatic Pipe Tester with *Oilgear Application-Engineered Fluid Power System* as installed in 1937, and operating continuously since that time. Oilgear "Power-Paks" (A,B), Intensifier (C), Rapid Traverse Testing Head Cylinders (E) are indicated by arrows. Manifold and Control Valves at operator's station (M_V in drawing) are clearly visible, as are the direct-reading, operating pressure gages on the "Power-Paks." Testing pressures are quickly preset with a small handwheel on "Power-Pak" (B)—not visible. Pipe to be tested rolls directly from pre-testing storage racks, at right, directly into the machine.



HOW IT WORKS: Pipe to be tested (P_2) rolls from storage rack (X) into cradle of machine between Testing Head (T) and Tail Carriage (D). Testing Head (T) is moved forward quickly by Double-Acting Cylinders (E). Clamping Jaws actuated by Cylinder (G) grip the pipe along its length to prevent buckling. Pipe (P_1) is pre-filled with water at city pressure (W). Single-Acting Test Head Holding Cylinders (F) move up in matching pairs—2, 4, 6, 8, 10, or all 12 can be selected—depending on pipe size and testing pressure to hold Testing Head (T) against Pipe (P_1) and Tail Carriage (D). Movement of cylinders (E, F, G, H) are all controlled by valves mounted on Manifold (M_V) which direct fluid flow from Oilgear "Power-Pak" (A). Water at preselected test pressure from Intensifier (C) then exerts pressure on Pipe (P_1). Oilgear "Power-Pak" (B) supplies *Fluid Power* through Valve (V) to actuate Hydraulic Intensifier Cylinders (C_2) increasing pressure in Water Cylinders (C_1) to any desired pressure up to 6000 psi. After pipe is inspected, intensifier pressure is released, Testing Head (T) is rapidly retracted, and Knockout Cylinder (H) actuates mechanism to eject tested pipe onto rack (Y). Machine is then ready to start a new test cycle.

SOLUTION: An *Oilgear Application-Engineered System* consisting of two Oilgear Heavy-Duty "*Power-Paks*," Directional Control Valves, and "Custom-Quality" Cylinders. Each "*Power-Pak*" uses an Oilgear Heavy-Duty One-Way Variable Displacement Radial Rolling Piston Pump with automatic pressure unloading control to reduce pump stroke when holding a preset pressure indefinitely; eliminate excessive heating and power loss; reduce electrical power input requirements. Oilgear Pumps contain integral auxiliary systems for pilot, supercharge, cooling and filtering . . . with constant pressure and flood self-lubrication, conservatively loaded anti-friction bearings, and large internal passages—mechanical and hydraulic friction is reduced to a minimum for high efficiency . . . virtually guaranteeing a long, trouble-free, maintenance-free life.

USER REPORTED IN 1938—"*. . . after one year of operation we have nothing but the highest praise for the Oilgear Equipment on this pipe tester.*"

USER REPORTS IN 1960—"*This machine has given us years of trouble-free service, operating around the clock six days a week . . . maintenance has been at a minimum, with occasional changes in intensifier packings, as would be expected in normal operation . . . performance has been completely satisfactory.*"

With Oilgear Heavy-Duty System Components designed for thousands of hours of continuous service at full rated load, savings are compounded with every hour of uninterrupted performance. That's why machinery and equipment manufacturers and *their* customers say . . .
"*For the lowest cost per year . . . it's Oilgear!*"

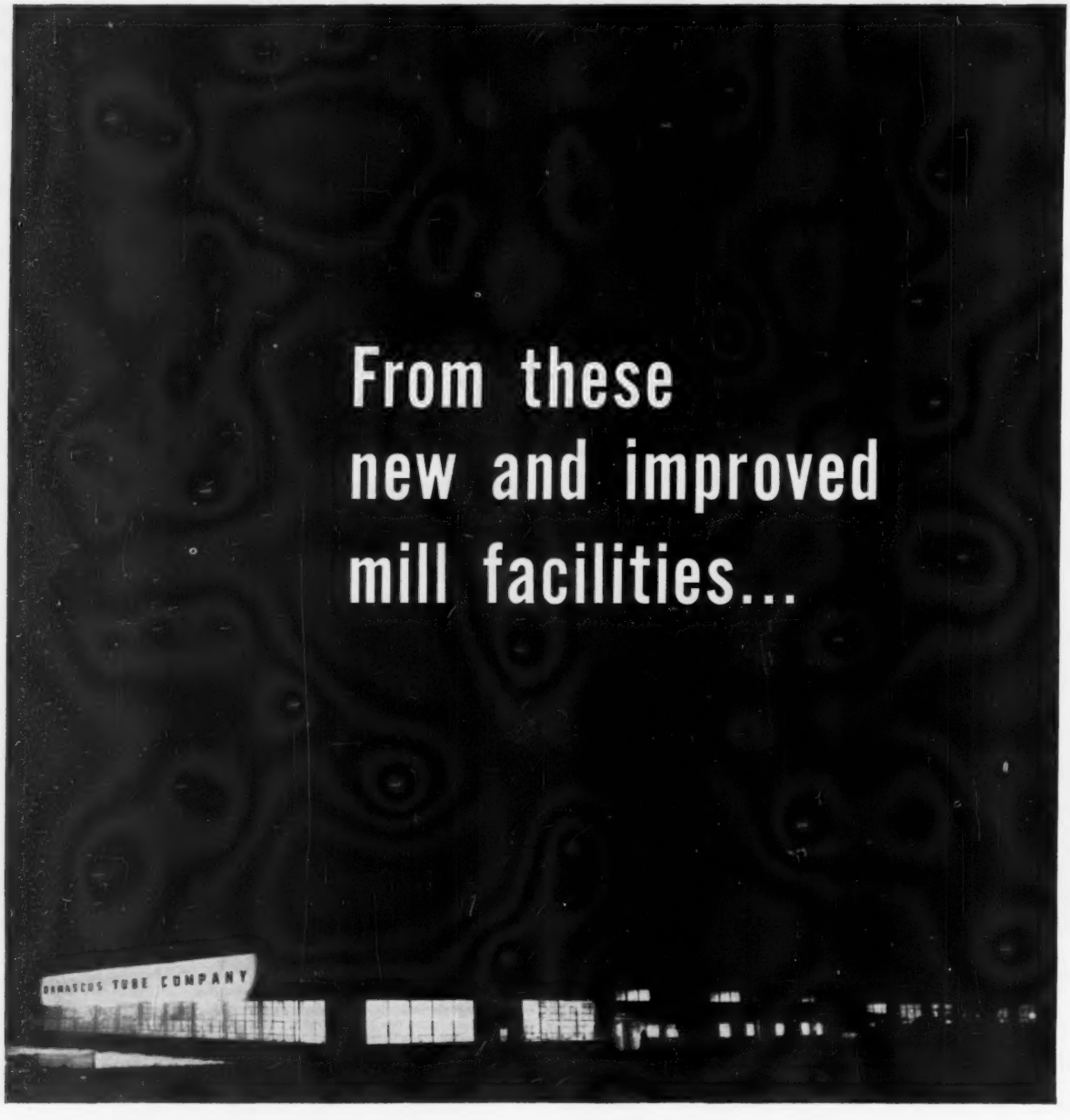
For solutions *to YOUR linear or rotary Controlled Motion problems, call the factory-trained Oilgear Application-Engineer in your vicinity. Or write, stating your specific requirements, directly to . . .*

THE OILGEAR COMPANY

Application-Engineered Controlled Motion Systems

1572 WEST PIERCE STREET • MILWAUKEE 4, WISCONSIN

Phone: Mitchell 5-6715 . . . Direct Distance Dialing Code 414



. . quality welded stainless steel tubing and pipe

TUBING: ½" O.D. x .022 wall to 3" O.D. x .148 wall

PIPE:		
	Schedule 5	⅛" I.P.S. to 2½" I.P.S.
	Schedule 10	⅛" I.P.S. to 2½" I.P.S.
	Schedule 40	⅛" I.P.S. to 2" I.P.S.

STEEL SERVICE CENTER INSTITUTE

AMASCUS TUBE COMPANY

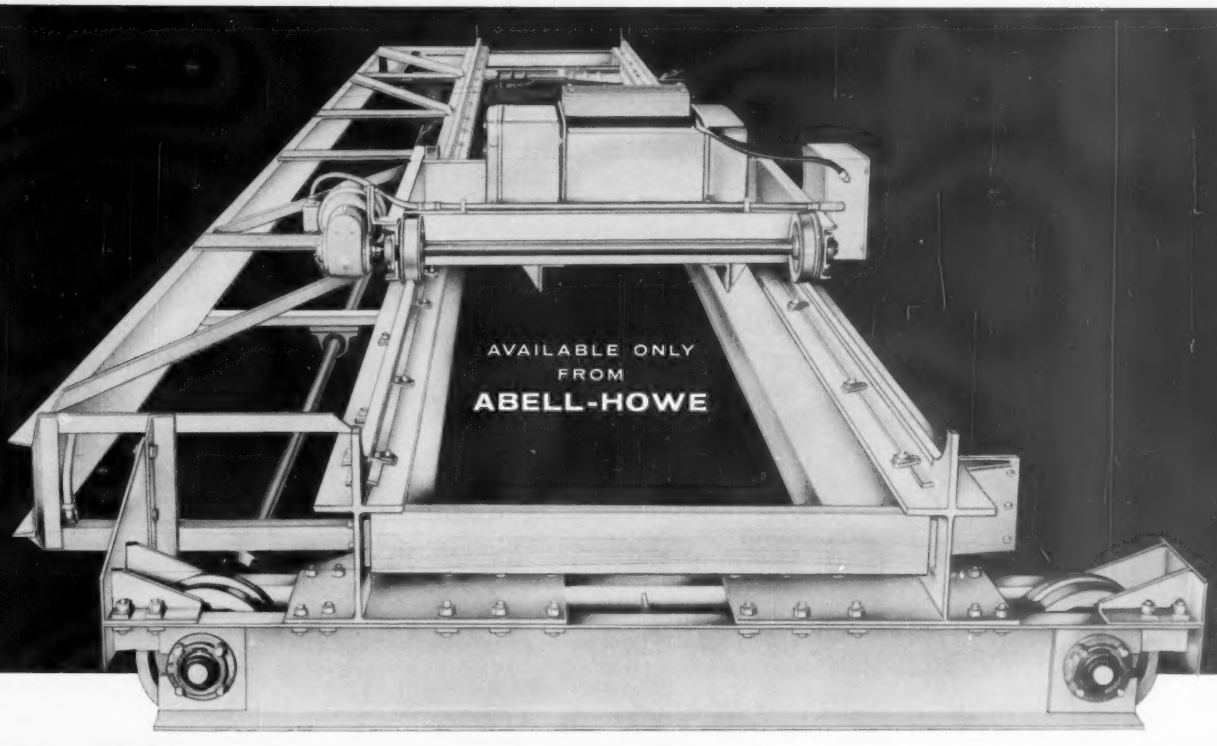
STAINLESS STEEL TUBING AND PIPE

GREENVILLE, PENNSYLVANIA

Steel

A NEW EXPERIENCE

IN OVERHEAD HANDLING EASE AND ECONOMY



ABELL-HOWE CRANEMASTER

Make no mistake—this is no ordinary, run-of-the-mill crane. Here is more crane quality—more modern design per dollar than you can get in any other crane built today. Direct drive, of course . . . die forged, machined alloy steel wheels with tapered tread . . . precision ball or roller bearings plus every other feature you want.

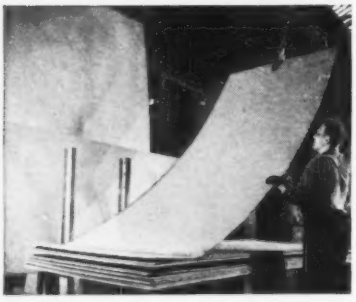
The result is the quietest, slickest, most maneuverable crane of them all. You can actually see, hear and feel the difference.

Those men who have already selected the all-new Cranemaster agree it's a honey—the best one yet. You can read all about this new experience in overhead handling ease and economy in a new 12 page Cranemaster bulletin, ready now. Or drop us a line and we'll come calling with some interesting facts and figures.

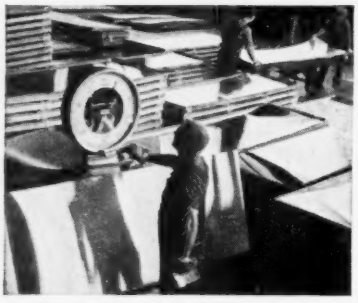
New 12 Page Catalog tells why Cranemaster can't be beat in performance or price! Ask for Bulletin.

ABELL-HOWE COMPANY
7757 Van Buren Street • Forest Park, Ill.
Phone: EStebrook 9-6300

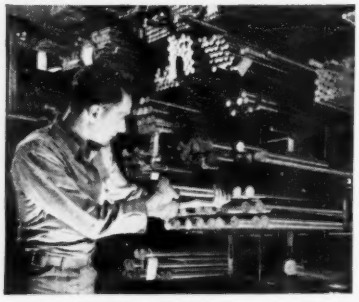
BUYERS' GUIDE . . .
to Ryerson service on stainless



PLATES—Available in 9 analyses including plates to Atomic Energy Commission requirements and to ASTM specifications for code work. Also low carbon types for easy welding.

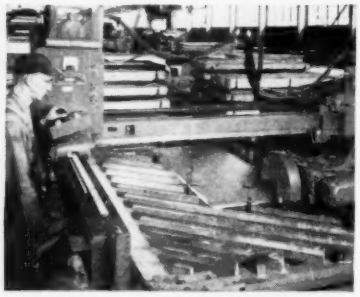


SHEETS—11 analyses of Allegheny stainless sheets in stock including nickel and straight chrome types. Also extra wide sheets to reduce welding costs, expanded and perforated sheets.

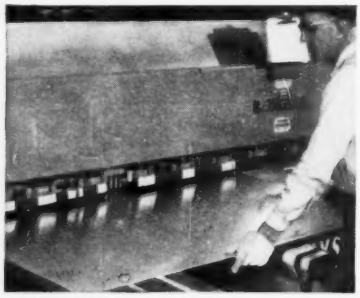


BARS AND ANGLES—Rounds, squares, flat's, hex's and angles in 8 types including free-machining bars with both analysis and mechanical properties controlled.

HELIARC CUTTING available on request. Cleaner, smoother cut edges. Better machining because of minimum contamination and distortion. Less carbide precipitation.



TRUE-SQUARE ABRASIVE CUTS.—Stainless plates to 12' x 25' cut true square on abrasive disc machine. Length and width tolerance plus or minus 1/32".



SHEARING—Accurate cutting of stainless sheets and light plate to the industry's tightest specifications. Shear hold-down clamps padded to protect sheet finish and flatness.

RINGS AND DISCS—Machine cut to your order. This service assures size accuracy, smooth edges, flatness and unaffected corrosion resistance—a lower-cost, ready-to-use product.

HEADS—A.S.M.E. flanged and dished heads in types 304, 304L, 316 and 316L are on hand in large quantities, and in a wide range of gauges and sizes.

PIPE AND TUBING—Light wall, standard and extra heavy pipe, ornamental and regular stainless tubing. Also screwed type and welding fittings and Cooper stainless valves.

STEEL • ALUMINUM • PLASTICS • METALWORKING MACHINERY

METALOGICS

RYERSON STEEL®

Joseph T. Ryerson & Son, Inc., Member of the INLAND® Steel Family

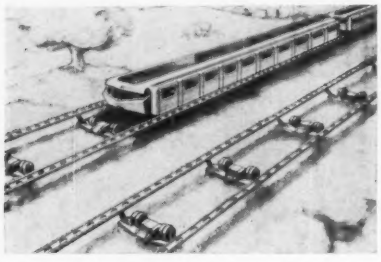
SERVICE CENTER PLANTS: BOSTON • BUFFALO • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DETROIT • HOUSTON • INDIANAPOLIS
LOS ANGELES • MILWAUKEE • NEW YORK • PHILADELPHIA • PITTSBURGH • ST. LOUIS • SAN FRANCISCO • SEATTLE • SPOKANE • WALLINGFORD

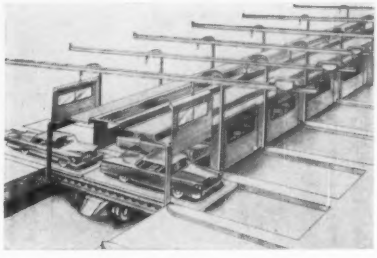
STEEL
The Metalworking Weekly

Metalworking Week®

January 23, 1961

Westinghouse Proposes 'Roller Roads'





Westinghouse Electric Corp. has proposed a high speed, electrical highway system for autos or rapid transit trains. The carriers are propelled by a series of rollers. The system would move autos—safely and reliably—at speeds up to 150 mph, says Westinghouse.

Low Point in Recession Passed?

The recession has hit a majority of 184 manufacturing firms surveyed by the National Industrial Conference Board, but 3 out of 4 do not expect their new order trends to drop farther. More than half predict a marked upturn in new orders before midyear, or say they're already noting such an increase.

PA Survey Uncovers Hopeful Sign in Inventories

The latest monthly survey by the Purchasing Agents Association of Chicago indicates that the inventory reduction trend is approaching a reversal point. More respondents (11 per cent) built stocks in December than in any month since September, and fewer firms (35 per cent) reduced stocks in December than in any month since September.

How the New Budget Stacks Up

Ex-President Eisenhower's budget is certain to be amended by President Kennedy, but not substantially. Defense spending, important to you, will rise about $1.4 billion. More money is earmarked to boost exports. Research and development outlays will be up. On the other side, some budget proposals will add to your costs of doing business. Some new services may help you. On Page 23, you'll get a closer look at details which affect metalworking most (Story starts on Page 21.)

More on the Gold Exodus

During 1960, the U. S. lost $1.99 billion worth of gold—all but $100 million after July 1. At yearend, U. S. gold stocks totaled $17.767 billion (counting

a $300 million purchase from the International Monetary Fund), to put our inventory at its lowest point in more than 20 years. The Eisenhower administration's move to prohibit holding of gold abroad by U. S. citizens and companies has been interpreted in London and Johannesburg as somewhat bearish for the U. S. dollar. Said one London bullion trader: "The U. S. clearly hopes that gold sales by U. S. citizens will more than outweigh any purchases by continental and Middle East operators who might interpret the American move as a sign of weakness. Whether it will work out that way remains to be seen."

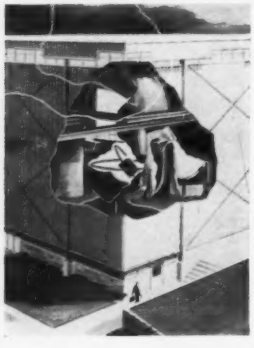
31,750 Lb Ingot to Go into Hull of *Aluminaut*

This giant (26½ x 72 x 180 in.) ingot of aluminum alloy 7079 will be forged into the first of several rings which will form the hull of the *Aluminaut* —an aluminum research submarine. Cast by Reynolds Metals Co. at McCook, Ill., the 31,750 lb ingot is said to be the "largest rectangular aluminum ingot ever made."

Petrochemicals Stiffen Competition

Look for stiffer competition from petrochemicals for coal chemical markets —and a possible comeback for nonrecovery coke ovens in some areas. But byproduct ovens are still getting a vote of confidence from some steelmakers because they look for more favorable market conditions, or because of a bonus—air pollution control—offered by chemical recovery equipment. And some firms are considering semi-byproduct ovens, which will provide gas cleaning facilities and permit recovery of some chemicals (Page 60).

GE Builds Space Simulation Lab

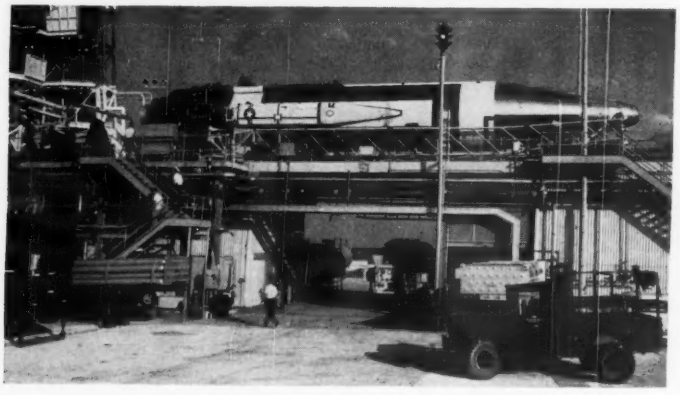


This sketch of General Electric Co.'s $6 million, Space Environment Simulation Lab (being built at Valley Forge, Pa.) shows (in cutaway) the device that will duplicate space conditions to test full size space vehicles. A "cold sun" effect will be achieved by using a 22 ft mirror to beam energy on a test vehicle while deflecting all energy transmitted toward it to the cryogenic walls. To be completed by mid-1962, the lab will be used to research such items as behavior of metals and operation of electronic equipment.

European Community's Steel Output Hits Record

The six nations of the European Steel & Coal Community turned out a record 72.8 million tons of steel last year—a jump of 15.3 per cent from 1959's 63.1 million tons. Italy scored the largest gain—21.5 per cent, to 8.2 million tons. Holland's production rose 16.1 per cent to 1.9 million tons. U. S. output last year was 99.3 million tons.

Military Outlays Boost Growth of Instrumentation



The U. S. instrumentation industry, which posted a sales record of nearly $200 million in 1960, will chalk up another record this year, believes James S. Locke, vice president, Minneapolis-Honeywell Regulator Co. He says military expenditures, already at a high level, may be increased substantially. He also points to capital improvement programs and high R&D outlays as major factors in the growth of instrument sales.

Formal System Crops Manufacturing Costs

A program of constant cost patrol has shaved costs 1 per cent a month for the last five years at Tapco Jet Div., Thompson Ramo Wooldridge Inc., Cleveland. The program depends heavily on planned cost targets and on monthly measurement of progress. Heading it up (left to right): W. H. Goldbach, chief industrial engineer; W. S. Johnston, manager of operations; and A. H. Schweitzer, division manager. For how they do it, see Page 52.

Scientist Suggests Triple Play to the Moon

Dr. Roy G. Brereton of Aerojet-General Corp.'s Advanced Research Div. feels that a "triple play system" is the only practical way to conduct regular moon expeditions. He suggests that a rocket powered shuttle ship would take the spaceman to a station in orbit around the earth. The traveler would transfer to an ion-powered spaceship for the trip to another station in orbit around the moon. Then a rugged, rocket powered craft would take him to the moon itself. All three vehicles would be re-useable. Timetable: 10 minutes to the earth-

STEEL The Metalworking Weekly

January 23, 1961 Vol. 148 No. 4

CONTENTS

THE EDITOR'S VIEWS:
Imports Strike Home! 17

WINDOWS OF WASHINGTON:
Goldberg Backs Depreciation Reform 28

MIRRORS OF MOTORDOM:
SAE Show Goes International 37

THE BUSINESS TREND:
Index Rebounds from Holiday Slump 41

NEWS SECTION:
How the Budget Stacks Up 21
Budget Briefs for Metalworking 23
Win Co-operation from Employees .. 24
Order Lag Becalms Shipbuilding .. 26
Livernash Reports on Steel Labor Strife, Effects on Economy 27
Rhodesia Swells Steel Potential 31
Get More from Your Sales Reps ... 32
Woman Competes in Selling Metals . 34
Alcoa Expands Fabricating Units ... 48

TECHNICAL SECTION:
Technical Outlook 51
How Constant Cost Reduction Works 52
Diffusion Method Bonds Copper ... 55
Fittings Are Hot Formed 56
Progress in Steelmaking—Coke-making Methods Are Reappraised 60
Nuclear Gage Has Many Uses 62
Machine Topics—Space Age Problems Advance Knowhow 63
Electronics Measures Sheets 64
Small Welding Unit Performs Big .. 65

MARKET SECTION:
Market Outlook 73
Complete Index to News and Prices . 73
Steel Mill Product Shipments Up .. 74
District Ingot Rates and Chart 75
Scrap Loses Some of Its Punch 85
Canada Sets Pig Iron Record 87
Nonferrous Metals—Metalmen Want Price Stability 88

DEPARTMENTS & INFORMATION:
Servicenter 5
Editorial and Business Staffs 6
Metalworking Week 11
Metalworking Pulse 14
Men of Industry 44
New Products 67
New Literature 71
Advertising Index 93

©1961, The Penton Publishing Co.
All rights reserved.

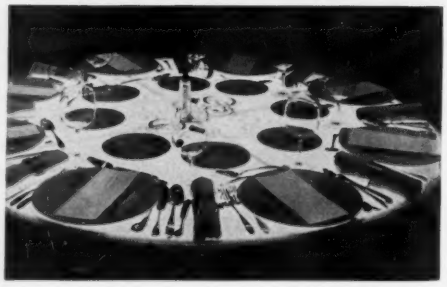
Editorial Index available semiannually.

STEEL also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

orbiting station; 3 days, 12 hours to the moon-orbiting station; 10 minutes to the moon. Dr. Brereton adds half an hour if your wife is to pick you up at the moonport.

Manhattan Club Has Tables that Glow

Eight tables in the Tower Suite Restaurant (atop Manhattan's Time & Life Building) have electroluminescent tops made by Westinghouse Electric Corp. The swank eating place is called the Hemisphere Club at lunch time, when it's operated as a private club.



Pigs to Go Piggyback

Even pigs will travel piggyback this year. They'll move on two and three deck, demountable, railroad livestock carriers, which are among facilities expected to boost piggyback carloadings to more than 700,000 in 1961. Piggybacking now accounts for 3 per cent of all goods shipped by rail.

Straws in the Wind

The Canadian Association of Purchasing Agents' latest survey finds 32 per cent of the firms contacted are cutting stocks and 13 per cent increasing them . . . Bookings by makers of material handling equipment in November fell to 98.9 (1954=100), the lowest level since August, 1959, and second lowest point since September, 1958, the Material Handling Institute Inc. reports . . . November new orders for foundry equipment rose 30 per cent above the October level . . . The Israeli government and Fairbanks Whitney Corp., New York, have developed a mass production machine for extracting fresh water from sea water . . . A General Electric Co. survey of more than 100 job shops using numerically controlled machines shows that the average shop uses its equipment 65 hours weekly, with a downtime of only 6 per cent.

Metalworking Pulse

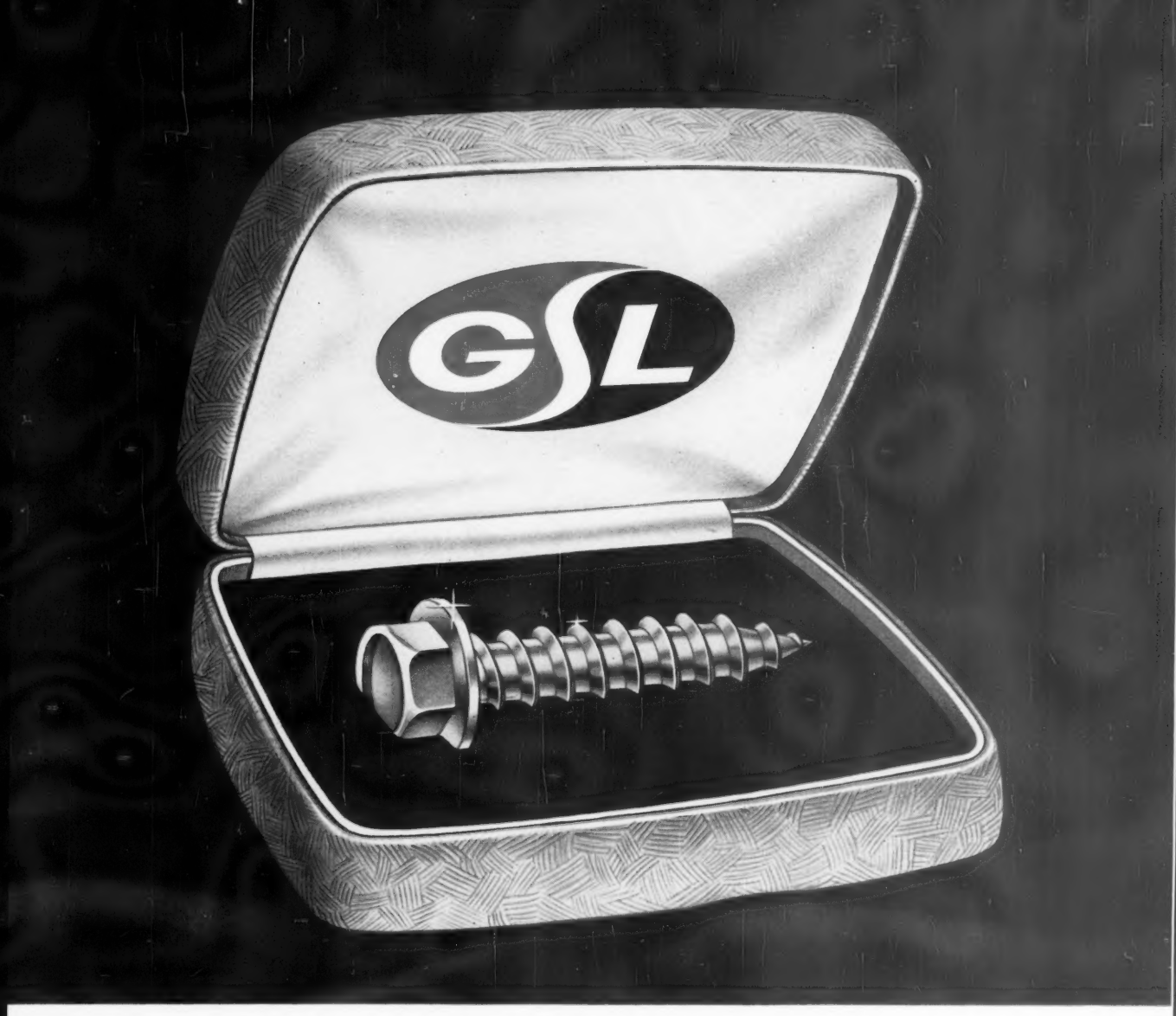
The Business Trend: STEEL's industrial production index advanced 10 points in the latest week, about normal for the postholiday season. But for the near future, the increase in steelmaking will not be sufficient to overcome declines elsewhere. **Autos:** Output in January is likely to be at the lowest point for that month since the Korean War year of 1952. Sales are down; stocks are still climbing. **Steel:** Continuation of the slow gain in ingot output is expected.

- **INDUSTRIAL PRODUCTION INDEX**
  (1947-49=100)
  Week ended Jan. 14 .... **148†**
  Year ago **184**
  Details on Page 41

- **PASSENGER CAR OUTPUT (UNITS)**
  Week ended Jan. 21 . **112,000***
  Year ago **175,060**
  Details on Page 38

- **STEEL INGOT OUTPUT (TONS)**
  Week ended Jan. 14 **1,525,000***
  Week ago **1,482,000**
  Details on Page 75

†Preliminary. *Estimated.



the new symbol of quality...

... with the background of time tested experience

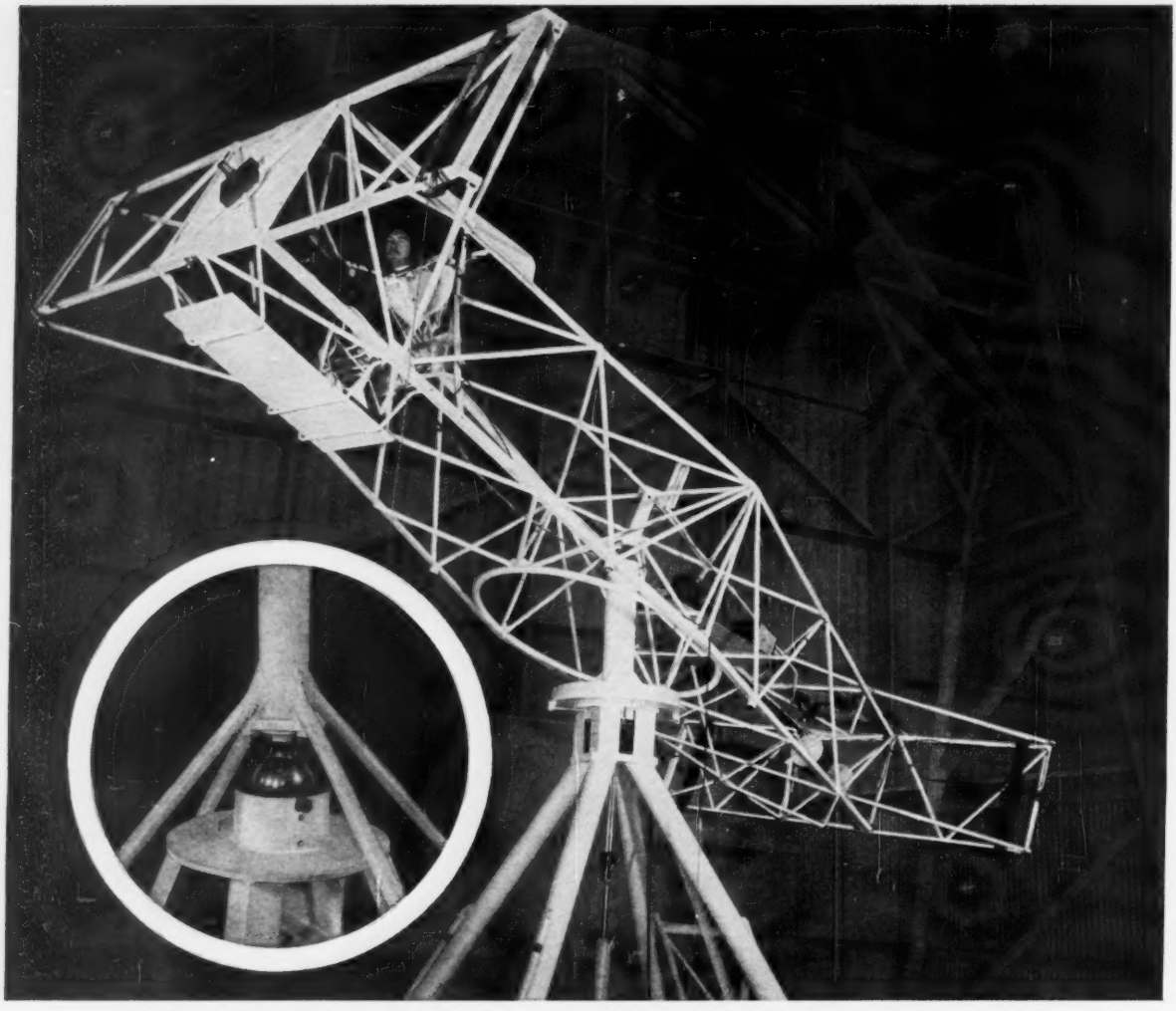
For almost two decades we have been creating talented fasteners to solve the problems of modern industry. Allow us to present our new look. In the future you will find this attractive new symbol proudly identifying all GLS creative accomplishments in fastener design. Look for this symbol when you look for fasteners that do the most work with the least effort and least cost to you. Every GLS fastener is a jewel of perfection backed by experienced design engineers, master craftsmen and our new trademark - your *guarantee* of finest quality.

GSL

GREAT LAKES
SCREW CORPORATION

EXECUTIVE OFFICES • CHICAGO 27, ILLINOIS

THE EDITOR VIEV
VIEWS OF EDITO



MAKE-BELIEVE FLIGHT—Much of the feeling of flight in a space vehicle is experienced during a ride in this reaction-control simulator, being put through its paces at Boeing Airplane Co., Seattle, Wash. The simulator rides atop the nickel alloy steel ball plated with Nickel in Boeing's ball-and-socket type air bearing.

Space simulator gives the "feel" of flight

Nickel-plated ball of high strength steel supports reaction-control test vehicle

This earthbound space machine is designed to test ways of controlling a vehicle as it pitches, rolls and yaws in the airless reaches of outer space.

In action, the simulator and its payload of test equipment can weigh as much as 5,000 pounds. Yet the necessary sensitivity is achieved by floating the unit on an air-cushion bearing made of a high strength nickel alloy steel ball in its socket.

Imagine this 2½-ton load resting on a ball about the size of a grapefruit! The ball, made of nickel alloy steel heat treated to a tensile strength of 180,000 to 200,000 pounds per square inch, stands up to the load. To provide a hard, smooth surface, the ball is plated with one-thousandth of an inch of Nickel. This uniform surface keeps air leakage in the bearing to a minimum.

Remarkably durable, Nickel and its alloys offer practical solutions to problems of stress, fatigue, abrasion, corrosion or temperature extremes. Used in alloys, in plated coatings or by itself, Nickel helps make possible many new products and processes—and can help improve existing ones—by providing unique combinations of properties.

Can we help you solve a difficult problem in materials? Perhaps you or your engineers can profit from the technical data we have on hand. This information is yours for the asking.

THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street New York 5, N. Y.

INCO NICKEL

NICKEL MAKES ALLOYS PERFORM BETTER LONGER

Imports Strike Home!

The effects of low priced imports are at long last getting through to our business and working people.

Last week, a visitor to the Port of Houston, 50 miles from the Gulf of Mexico at the terminus of the Houston Ship Channel, could have watched more than a score of ships busily unloading foreign steel and other products.

Down the channel a few miles, the visitor could see a major steel plant with its blast furnace down cold; 1000 of its 4000 employees are out of work.

Still farther down the channel, the visitor could have watched sea gulls idling over the site for another large steel plant. Ground will not be broken until a market for its products is assured.

Such incidents are bringing about a profound change.

Low priced imports are being viewed more and more in terms of lost jobs and lost business and less and less as attractive bargains.

The 496,000 tons of foreign finished steel brought into Texas ports in 1960 can readily be translated by manufacturers, jobbers, and individuals into 10 million hours of lost wages and $40 million of lost earnings that could have been spent on U. S. products and services.

So savings of $35 a ton on imported wire rods, $25 a ton on reinforcing bars, $2.50 a reel on barbed wire, and $1.50 a keg on nails are becoming less important.

As a result, more municipalities are joining Houston and nearby communities in prohibiting the use of imported steel. The state bans imported steel in road construction.

Typically, a distributor has told his customers that he is dumping his current stock of foreign steel at a 10 per cent discount and "going 100 per cent American."

Another distributor labels each shipment with: "This shipment contains only specification material made in the U. S. A."

Many manufacturers are thinking twice before specifying imports.

Of course, a Buy American movement is not the logical and final solution to the import problem.

All industry wants is the opportunity to compete on an equal footing in world markets. Our restrictions on imports are limited or nonexistent.

The General Agreement on Tariffs & Trade needs revision to give U. S. industry a fair shake both here and abroad.

The men to talk to about your problems are your congressmen or Secretary of Commerce Luther H. Hodges.

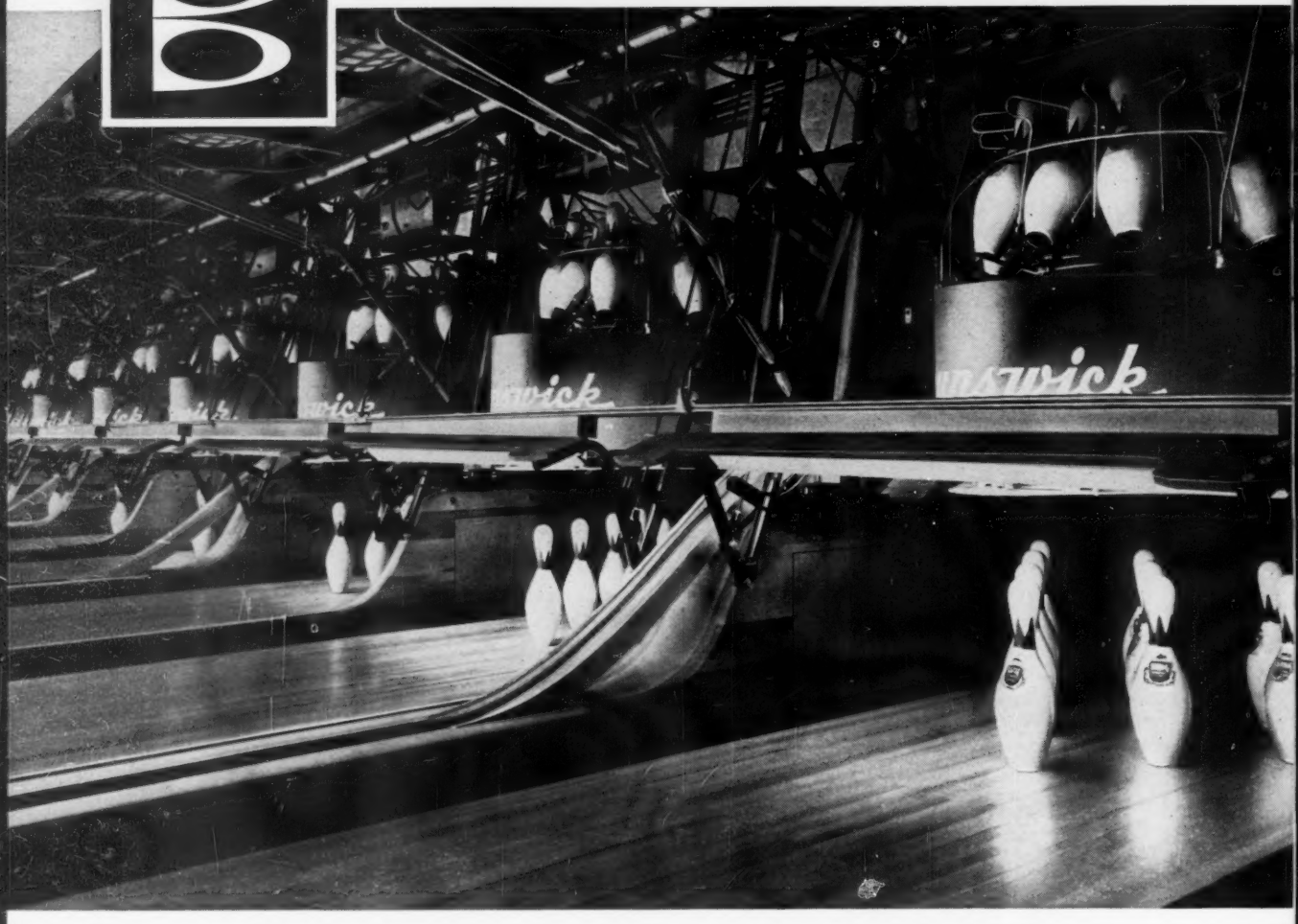
We hope you will!

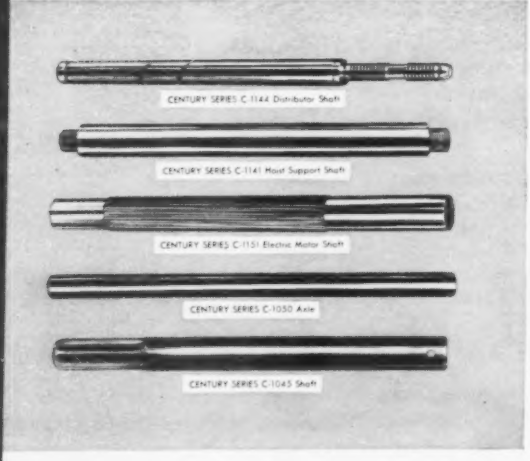
Irwin H. Such

EDITOR-IN-CHIEF

THE EDITOR VIEWS OF EDITO

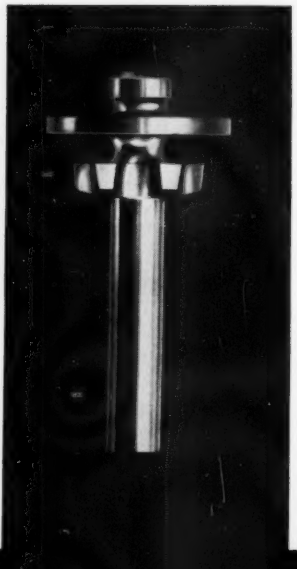
Brunswick CORPORATION puts "Mechanical Brain" to work




CENTURY SERIES C-1144 Distributor Shaft
CENTURY SERIES C-1141 Hoist Support Shaft
CENTURY SERIES C-1151 Electric Motor Shaft
CENTURY SERIES C-1050 Axle
CENTURY SERIES C-1045 Shaft

HIGH MACHINABILITY is the reason Republic ENDURO® Stainless Steel, Type 303, was selected by the National Acme Company in producing one-piece Hyseal Valve Stems for the new American-Standard single-lever mixing faucet. Ten operations, including a multiple end drilling of six holes on a 15° angle are performed in just 12 seconds in a single setup. Write for information on the more than 40 types of Stainless Steel available from Republic. Use coupon.

SPECIFY DEGREE OF MACHINABILITY. Select from Republic's CENTURY SERIES of high strength, stress-relieved, cold finished steel bars. Five grades: C-1045, C-1050, C-1151, C-1141, and C-1144. Each offers minimum yield strength of 100,000 psi. For parts needing little machining, better strength-to-toughness ratios are often obtained with one of the less expensive, lower sulphur grades. Send for your free copy of Republic's CENTURY SERIES Booklet.



with ELECTRUNITE Mechanical Tubing

Better bowling by Brunswick. Better automatic pinsetting with ELECTRUNITE. That's the story behind today's most popular participation sport—bowling for the entire family.

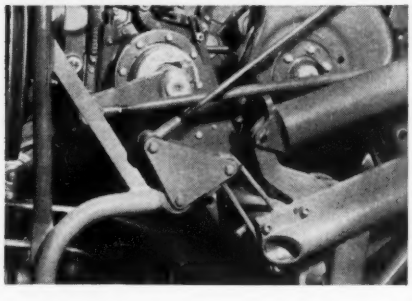
The Automatic Pinsetter, designed and produced by the Brunswick Corporation, Bowling Division, Chicago, Illinois, is a precision engineered, rugged, mechanical unit designed to set pins, sweep away "deadwood" and reset remaining pins, all in the matter of seconds, automatically.

Republic ELECTRUNITE Mechanical Tubing was specified because it met the extreme tolerance requirements with a substantial savings in weight. No sacrifice in strength. High quality ELECTRUNITE is delivered ready for fabricating. Excess manufacturing costs squeezed out.

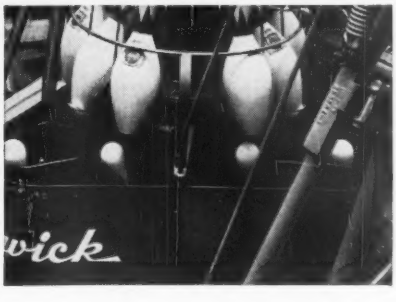
Republic, world's largest producer of specialty welded tubing, offers ELECTRUNITE in a wide range of sizes, gages, and wall thicknesses, supported by technical and metallurgical assistance. Prompt price and delivery quotations usually within twenty-four hours. Call your Republic representative. Or, write direct. Use coupon below.

In just 12 seconds, the Brunswick "Magic Brain" sets up the alley for the next shot. The ball takes an elevator ride on ELECTRUNITE Mechanical Tubing to start the return trip to the bowler.

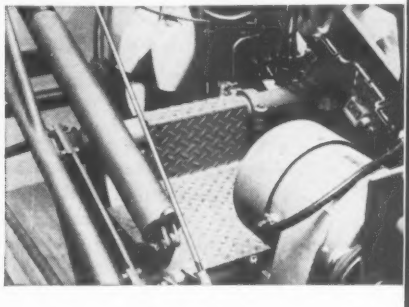
When the ball hits the hinged pit cushion the motion is mechanically transferred to trigger the machine cycle. ELECTRUNITE Mechanical Tubing is used for the pit cushion support arms construction.



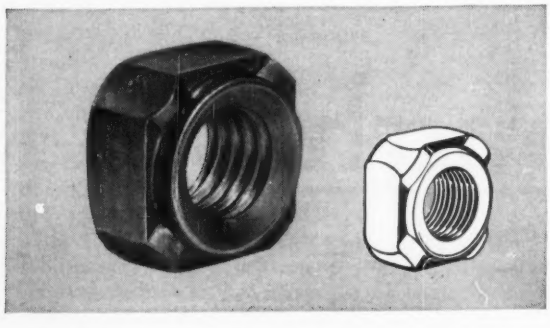
ELECTRUNITE Tubing in three key locations assures smooth, trouble-free lifting, sweeping, Automatic Pinsetter operation. ELECTRUNITE is delivered ready for fabricating, saving production time and costs.



ELECTRUNITE was specified by Brunswick because it meets the extreme tolerance requirements, eliminating the need for any additional machining operations.



REPUBLIC MIDLAND WELD NUT is the newest addition to the more than 20,000 different types and sizes of Republic Fasteners. Republic Weld Nuts save time and money, solve difficult design and assembly problems. Applied quickly and easily by any standard projection welding machine of proper capacity. Fast, accurate positioning. Positive weld. Sure holding power. Ideal for the fabrication fastening, or assembly of metal parts. Write for additional data.



REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL — Strong, Modern, Dependable — Steel

REPUBLIC STEEL CORPORATION
DEPT. ST -1600
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send more information on the following products:

- ☐ ELECTRUNITE® Mechanical Tubing
- ☐ Republic Midland Weld Nuts
- ☐ Republic ENDURO® Stainless Steel
- ☐ CENTURY SERIES Booklet

Name_____ Title_____

Firm_____

Address_____

City_____ Zone____ State_____

How the choice of a cutting fluid affects your costs

Often—perhaps *too* often—the supplier of cutting fluids for machining or grinding, points to the quality of the work and totally ignores its surprising counterpart—a lower over-all cost of operation.

Many a user of petroleum-base fluid might never notice the oversight. A better fortified coolant, which costs more per gallon, would not seem to reduce the final cost of the work, although it can readily be proven to produce better machined parts.

But it is pertinent to examine more closely the cost factors. The facts may surprise machine shop men who have not fully considered all the items which influence their costs. The measurable, tangible cost factors are these:

- Initial cost
- Cost of mixing
- Production rates
- Tool or wheel life
- Machining cost
- Overhead
- Cost of cleaning
- Life of the fluid
- Cost of rejects
- Reworking costs caused by rust

A comparison of first cost with final cost per piece, made on the basis of long experience with both conventional water-soluble oils and the newer chemically conceived fluids reveals some astonishing figures. Just a quick glimpse:

- The modern fluid costs about four times as much as the old soluble oil.
- But that modern coolant can be cut with three times as much water as the oil-base fluid.
- The modern coolant requires less make-up.
- It lasts over six times as long as the oil emulsion—contains nothing to make it turn rancid.
- It enables faster production—machines can be speeded up.
- It requires less frequent emptying and cleaning of machines.
- The over-all cost of coolant per piece produced has repeatedly proved to be upwards of *40% less* with a good chemically conceived coolant than with a conventional soluble oil!

There are intangibles, too, which are not as measurable, but which affect both cost and quality. To mention a few: Cleanliness of shop, operator satisfaction, visibility of work, smoke problems, accuracy of work, adaptability to a wide range of jobs, and safety (fire hazard, slipperiness of floors, etc.).

It is illuminating to examine all of these direct and indirect influences a cutting fluid can exert. Little wonder that it is termed the "third leg" of the base on which successful machining depends—the others, of course, being the tooling and efficiency of the machine itself.

Our concern is with the fluid itself, because Houghton has made and supplied many types through the past half-century.

Our recent successes have been with the chemically conceived types of coolants, scientifically fortified to do a double job of improving quality *and* cutting final costs. *Hocut 237* is a perfect example of such a coolant. Data on its applications and availability will gladly be supplied. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

Houghton

INDUSTRY'S PARTNER IN PRODUCTION

How the New Budget Stacks Up

Kennedy will prime the pump, trying to insure upturn . . .

Eisenhower offers a balanced budget, sees an upturn soon

LOOK FOR ex-President Eisenhower's $80.9 billion budget to be amended by President Kennedy, but it'll still be the basic document of federal policy through June, 1962 (the end of the fiscal year).

You can expect action in areas which have been defined since the campaign:

- Aid to depressed areas.
- Emergency funds to states for extending unemployment compensation.
- School construction.
- Housing.
- Public works.

• **Economic Rebound**—The budget assumes two things: 1. A strong rebound in the economy this year. 2. Congressional approval of measures to increase revenues. If those two assumptions come about, and the Kennedy administration does not add to the budget, a $1.5 billion surplus could result. Mr. Eisenhower predicts a surplus in the current budget, but many Kennedy men claim that it will wind up in the red.

The revenue measures Mr. Eisenhower asked Congress to approve, and which most likely will get support from the Kennedy administration:

- Extension of present corporate and excise taxes, which are scheduled for reduction or termination July 1.
- Establishment of "adequate" fees for government services, adding $16 million to federal revenues, including $7 million for increased patent fees.
- Increase in postal revenues by $843 million.
- Boost in motor fuel tax to 4.5 cents per gallon and other changes in highway financing to gain $848 million.
- Increase in aviation gasoline and jet fuel taxes to gain $100 million.

• **Depreciation Reform**—As expected, Mr. Eisenhower requested that income on the disposition of de-

Defense Budget Beefed Up

(Millions of dollars for fiscal years)

	1962	1961	1960
Military personnel	$12,390	$12,143	$11,738
Operation & maintenance	10,672	10,400	10,223
Procurement	14,372	13,753	14,312
Army	1,643	1,410	1,605
Navy	4,411	4,272	3,680
Marine Corps	161	155	140
Air Force	8,208	8,130	8,763
Research, development, test & evaluation	4,388	4,148	3,732
Army	1,071	939	705
Navy	1,249	1,120	767
Air Force	1,618	1,391	1,089
Advanced Research Projects Agency	204	290	314
Emergency fund	150	39	0
Construction	1,327	1,368	1,626
TOTAL BUDGET*	$42,910	$41,500	$41,215

*Figures have been adjusted to reflect structure of the 1962 budget. Columns add to more than the totals shown because of revolving funds and carryovers from other years.

preciable property be treated as ordinary income to the extent of the depreciation deduction previously taken on the property. He calls this "an essential first step" to liberalized depreciation practices.

With an Eisenhower holdover in the Kennedy cabinet (Douglas Dillon as treasury secretary), industry can look forward to help. Secretary Dillon has promised to bring proposed tax reforms to Congress by April.

Ex-President Eisenhower said: "More liberal and flexible depreciation can make a major contribution toward neutralizing the deterrent effects of high tax rates on investment . . . By bringing the allowances for American business more nearly into line with those available to many foreign producers, improved depreciation procedures would not only strengthen the competitive position of American producers, but their benefits would also accrue to American workers through increased productivity and greater job opportunity." (See Windows of Washington, Page 28, this issue, and STEEL Jan. 16, pp. 35 and 36.)

• **Defense Spending**—Robert McNamara, new secretary of defense, has indicated he will take his time (perhaps three months) before recommending any significant alterations in the defense budget. As proposed, defense spending will rise about $1.4 billion, mutual security $250 million.

Stewart Udall, new secretary of interior, has promised to review programs which affect metalworking (lead and zinc, for example), but no crash effort appears to be in the works.

Space spending will be up $195 million in the 1962 budget. A task force reported to President Kennedy that more attention should be paid to the military aspects of our space program, but it hardly appears possible that present projects of the National Aeronautics & Space Administration will be halted or cut back. Among items in the budget for space: Spending will be increased for Project Rover (nuclear powered rocket for space travel), and emphasis will be placed on the Minuteman ICBM and the B-70 programs. About 10 per cent of the research and development allocation in the 1962 budget goes for peaceful space research.

• **Government Research** — The trend in federal spending for research and development continues to climb, with a $770 million rise earmarked for it in the budget. Historically, the trend reads: Fiscal 1960, $7.7 billion; 1961, $8.7 billion; 1962, $9.4 billion.

About 80 per cent goes to national security needs, including the Defense Department and the Atomic Energy Commission. Of the $9.4 billion, about $6.5 billion will go directly to private industry.

• **Treasury Attitude** — Ex-Treasury Secretary Robert Anderson believes fiscal 1961 receipts will be $1.3 billion above fiscal 1960's, that fiscal 1962's will be $3.3 billion above fiscal 1961's. He assumes personal income will rise to $415 billion this year, an $11 billion increase over last year's, while corporate profits will be $46 billion this year vs. $45 billion last year. The effect of the recession on budget planning can be seen easily when it's recalled that Mr. Anderson first estimated 1960's corporate profits at $51 billion.

The old administration's optimistic forecast for 1961 is based on these barometers:

- Retail sales have remained close to record levels.
- Personal income has shown remarkable strength.
- Disposable personal income, in terms of buying power, has continued to advance.
- Individual savings have increased substantially.
- Business has kept up its capital spending despite the profit squeeze.
- Government spending is rising.
- The inventory adjustment is nearing completion.
- The Federal Reserve System has eased money.

Budget Briefs for Metalworking

- **ATOMIC ENERGY COMMISSION**—Cost of the civilian power reactor program will rise to $180 million, up $9 million. The aircraft propulsion reactor program will be cut by more than 50 per cent, eliminating one of two research projects. Cost of the isotope development program will rise to $5.5 million, up $1.7 million.

- **EXPORT-IMPORT BANK OF WASHINGTON**—It expects to make 85 development project loans valued at $602 million. Under the new, short term, political risk guarantee program, it will make 350 contracts with a liability of $225 million.

- **FEDERAL AVIATION AGENCY**—Research on aircraft safety (including structural soundness) will almost be tripled.

- **FEDERAL TRADE COMMISSION**—Its budget is $9.6 million, up $1.6 million, to cover an increase in antimonopoly and deceptive practices investigations.

- **SPACE PROJECTS**—Examples of rising research costs of the National Aeronautics & Space Administration: Propulsion and energy conversion, up $5.1 million; structures, up $4 million; materials, up $5.3 million. Private firms will participate and be asked to contribute $10 million in the communications satellite program. The Mercury (man in space) project will be in the flight stage. New facilities for NASA will include equipment for vacuum research in plasmas, basic heat transfer studies, structural test laboratory.

- **SMALL BUSINESS ADMINISTRATION**—Procurement, technical, management, and research assistance will be up more than $300,000. SBA's share of loan commitments will rise $23 million. At least 135 loans, averaging $200,000 each, will be made to small business investment companies.

- **DEFENSE MATERIALS SERVICE**—General Services Administration will spend $2.1 million for new materials and the upgrading of present ones.

- **HOUSING & HOME FINANCE AGENCY**—Spending will reach $728 million, up $184 million.

- **CENSUS BUREAU**—Quarterly surveys of consumer buying plans will begin. Periodic surveys of key products in growth industries will be made. Work will begin on the 1963 censuses of business, transportation, manufactures, and mineral industries.

- **BUREAU OF FOREIGN COMMERCE**—The export expansion program accounts for much of a $2.5 million budget hike.

- **NATIONAL BUREAU OF STANDARDS**—Its research and technical services budget is up about 20 per cent.

- **PUBLIC HEALTH SERVICE**—Air pollution control, with emphasis upon automotive exhaust research, will cost $8.1 million. Water pollution research will cost $15 million.

- **BUREAU OF MINES**—Metals research will cost almost $10 million.

- **JUSTICE DEPARTMENT**—The budget of the Antitrust Division is up almost 10 per cent.

- **POST OFFICE DEPARTMENT**—Plant and equipment spending will run $122 million, including the modernization program.

- **NAVY**—Five new Polaris submarines will be funded (bringing the total to 19). R&D in antisubmarine warfare is boosted.

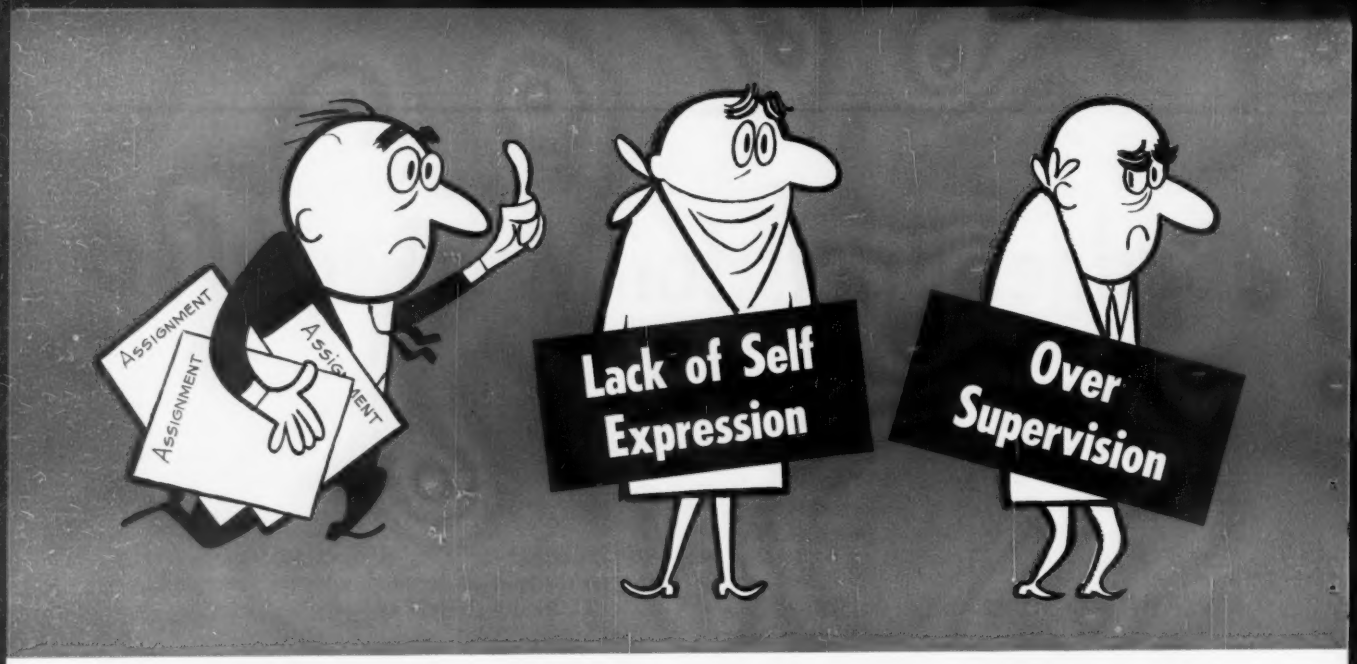
- **DEVELOPMENT LOAN FUND**—Spending will rise $150 million.

- **LATIN AMERICAN DEVELOPMENT**—A $500 million program will be funded as a supplemental appropriation to the fiscal 1961 budget.

- **HIGHWAY TRUST FUND**—Payments will rise $161 million.

- **BUREAU OF LABOR STATISTICS**—Funds for work will be increased as will those for enforcement of the Labor-Management Reports Act.

- **WATER RESOURCES WORK**—Spending of the Army Corps of Engineers and Bureau of Reclamation will be at all-time highs.



How to Win More Co-operation from

GETTING PEOPLE to co-operate means getting them to change their behavior. It's not easy. People tend to resist change, though change is often beneficial. To win them over, you can't resort to gimmicks. Basic skills are called for.

• **A Promising Approach**—The way to get people to co-operate is to find out what they want (what motivates them), then show them that they can best satisfy their needs by carrying out the organization's objectives. That's a recommendation made by Prof. Douglas McGregor, School of Industrial Management, Massachusetts Institute of Technology, in his book, *The Human Side of Enterprise*. Objective: Link the employee's job improvement to satisfying his needs.

Ordering something done doesn't achieve good results, Professor McGregor says. Orders don't spur people to maximum efforts. (He recommends the four approaches at the top of Page 25.)

Though the professor admits the system is more time consuming than simply handing a man a job description and telling him what his objectives are, he says there are compensating benefits: Subordinates require less policing and develop managerial skills at a faster rate.

• **Another View**—Psychologists and industrial relations experts interviewed by STEEL say the route to co-operation is smoothed if you have knowledge of your own job and competence in solving problems. Also important: Being considerate and sensitive to the wants and needs of others.

Psychologists say our strengths, weaknesses, and prejudices color reactions, so it's important to know yourself. If, for example, you're a naturally dominant type, your relations with others are likely to become contests. Possible remedy: Take a more cautious stand. Try to figure out how employees' ideas tie in with your own. Ask yourself these questions: What are my motives? What do I want? Is the goal I've set one that my subordinates can help me attain? What methods are open to me?

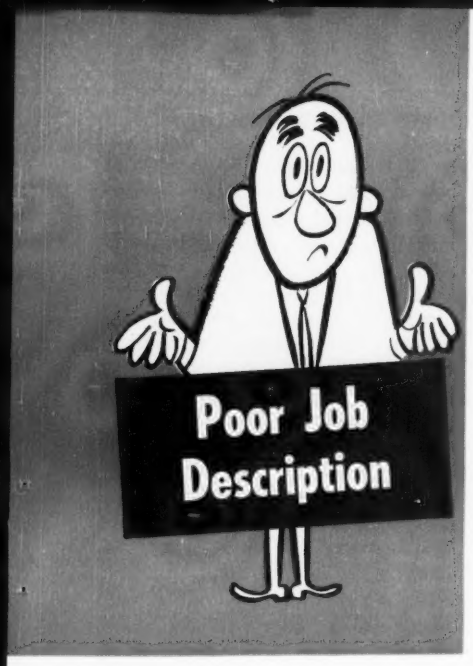
• **Be a Good Listener**—Differences in background, experience, and motivation can roadblock understanding which leads to co-operation. Says F. A. Roethlisberger, professor of human relations at Harvard Business School: "If I want to find out whether we really agree or disagree . . . I must restrain my natural inclination to presume what you mean and instead make an effort to draw you out."

Remember that your employees have their own needs, wants, and goals. One industrial relations man says there's no greater fallacy than to reason: "Well, if I'd been Jones, and my boss had given me that opportunity, I'd certainly have taken it."

• **Communicate Better**—Make special efforts to keep subordinates informed about your objectives and procedures. When co-operation is poor, misunderstanding is usually the cause, and the supervisor who tells too little is often at fault.

Take the manager who fumes: "I told that girl I had to have the report by 10 a.m. and she didn't get it done!"

Although late when he made the request, did he say an important customer wanted to discuss a con-



When job requirements are related to company objectives, personal needs are easily satisfied . . .

- Help the employee clarify the requirements of his job.
- Encourage him to set short term targets for improvement and ask what steps he'll take to reach them.
- Give him freedom to carry out his program, providing guidance only when you are called upon.
- Ask him to appraise his own performance at the end of the target period.

Employees

tract and that the deal couldn't be nailed down unless the report were ready?

If the manager had taken the trouble to inform the girl and get her interested in the project, chances are the job would have been finished on time.

• **Be Problem Centered**—Still another way of showing consideration is to view complaints in the spirit of "what happened" and "how can we prevent it from happening again" instead of "who's to blame?"

If you said: "You're tactless," to an outspoken salesman who is unwittingly costing your firm business, you immediately put him on the defensive—negating chances that he'll co-operate. Let the offender help you solve the problem. Ask him: "Why are we losing some of our customers? Can we sharpen our initial contacts?"

• **Allow for Feedback**—Show consideration by telling your people how they're doing. They're vitally interested in knowing the results of their efforts—whether the product they designed did the job or an idea met approval.

People can't be expected to improve if their weaknesses aren't pointed out to them. It's not that they can't see the forest because of the trees, it's usually because they are one of the trees. Give them perspective. Psychologists stress continual help and counseling instead of once-a-year, formal merit reviews.

• **Avoid the Pitfalls**—Here are some troublesome attitudes that hamper co-operation:

• Some people defend a pet scheme to the point where compromise becomes almost impossible. This situation crops up especially when two men on the same level are jockeying for position.

• Defining a problem in absolutes is common. Many people hold tightly to a solution as a matter of principle from which they won't retreat. This is often evident in labor-management negotiations and only puts both sides in the position of having to save face.

• Fear of delegating is a trap. Men who have grown accustomed to working by themselves and solving their own problems (such as engineers) are sometimes pushed into administrative jobs where they must manage people. Result: They figure tasks delegated to subordinates will be aborted and require correction.

• Oversupervision is a habit of some managers. They're fearful that the job won't be done right, and they spend all their time crossing t's and dotting i's. They might complain bitterly that none of their subordinates takes any initiative—but they never give anyone a chance to do so.

Kaiser-Union Team Slashes Grievance Backlog

WHILE KAISER STEEL'S "peace panel" got most of the headlines (Page 27) last week, a new company-union committee was reported to have made substantial progress.

Although the Long-Range Committee does not handle specific grievances, a subcommittee helped establish a six-man plant committee (three union and three company members) to tackle a backlog of 500 grievances which had not been settled.

These results were reported: The backlog has been cut to 196, with further progress being made daily, and the number of grievances submitted each month has been reduced by two-thirds.

Steel Shipments For Shipbuilding, Marine Equipment

Year	Tons (In thousands)
1960*	471
1959	642
1958	797
1957	1,278
1956	760
1955	601

*Nine months.
Source: American Iron & Steel Institute.

Order Lag Becalms Shipbuilding Activity

ANOTHER TRYING YEAR lies ahead for U. S. shipbuilders. Little, if any, improvement is indicated for this year over 1960, which was the dullest year since 1955.

The lag in building has been joined by a decline in repairs to the lowest level since World War II, reports L. R. Sanford, president, Shipbuilders Council of America. He foresees no early improvement. The situation, Mr. Sanford points out, has created severe competition among yards with bid prices "not at all commensurate" with costs.

• **Federal Funds Faint**—A depressant is the limited funds made available by the U. S. Bureau of the Budget for subsidies for the merchant marine replacement program. Industry leaders believe funds for building 24 ships a year are needed to maintain an orderly program. But during the last six years, appropriations have averaged less than enough to build 12 ships annually. Shipbuilders assert that is not sufficient to assure a contract for one ship per yard per year if awards were distributed equally among all yards capable of handling such work.

Prospects for this year, it is said, are even less. All accumulated funds are presently committed. No additional bids for replacement ships can be anticipated before late 1961 after new funds have been appropriated by the new Congress.

• **'62 Budget Up**—The fiscal 1962 federal budget calls for $115 million to be allocated to the Maritime Administration for construction subsidies, up $12.5 million from the 1961 figure. Research on mechanized ship programs will cost $4.8 million. The budget also provides for a year's operation of the *NS Savannah*, the world's first nuclear powered merchant ship.

Little interest is shown in the replacement of unsubsidized dry cargo vessels, or in special type vessels, such as tankers, ore carriers, and carriers of other bulk commodities, in foreign trade.

Some yards might go out of business unless they receive more orders—and at a profit, believes John R. Newell, president, Society of Naval Architects & Marine Engineers, and head of Bath Iron Works Corp., Bath, Maine. To help forestall that possibility, Mr. Newell suggests a shift in emphasis from nuclear powered to conventionally powered Naval and commercial surface craft. He argues that more conventional ships could be built for the cost of one nuclear ship and could be used more effectively.

• **Guns Aimed at Navy** — Private yards are driving for more Naval work, especially repairs. A recent study by the Atlantic & Gulf Coast Association reveals this work could be done by commercial yards at about one-third the cost in a Navy yard.

Greater diversion of Navy ship construction to commercial yards is also being urged. A trend in that direction appears to be in the making. Newport News Shipbuilding & Dry Dock Co. was awarded a large aircraft carrier late last year. Orders for smaller Navy craft have been placed recently with other commercial yards.

A current program is said to permit scheduling of 15 Naval vessels and 22 service and landing craft (value: $1,120 million) for placement in commercial yards over a period of several months. The program also calls for $70 million of repairwork. However, the Navy appears to be having the same trouble with the Bureau of the Budget as does the Maritime Administration.

• **Scorecard** — At the beginning of this year, the nation's shipyards were building or had on order 58 ocean-going merchant ships, totaling 834,700 gross tons, says the Shipbuilders Council. The survey included ocean and inland water vessels of 1000 gross tons or more, but no Great Lakes ships were on order.

In 1960, 23 ships with an aggregate of 269,700 tons were ordered. At the end of the year, 16 vessels, totaling 170,600 gross tons, were due for early placement. Launchings of ships of 1000 gross tons or more equaled 31 while 26 were delivered.

To cushion the lag in shipwork, most yards have gone in for some diversification. The range of the activities, especially at some of the larger yards, is impressive. But it does not begin to take the place, either in profits or employment, of ship construction and repairs for which the yards were established.

• **Troubled Times**—Example: New York Shipbuilding Corp., Camden, N. J. has a backlog of work, including six guided missile destroyers, three nuclear powered submarines, and two guided missile frigates. But unless something new develops, more than 3000 workers will have to be laid off shortly. The firm is the acknowledged low bidder on a contract to build a sister ship to the *SS United States* of the U. S. Lines. It is also low on a large passenger liner for Pacific Coast trade. Both bids opened many months ago.

Amounts necessary for the government's share in the construction of those ships have not been included in the latest budget for the Maritime Administration. And it appears that President Kennedy will go along with this budget with the possible exception of some added piecemeal allowances, undoubtedly in the area of defense.

• **Lake Shipwork Slow**—One problem is the dependency on the steel industry. Only two merchant ships were built at Great Lakes yards last year, with none actively pending. Repairwork is expected to pick up somewhat after the shipping season is well underway. The St. Lawrence Seaway has created competition for Great Lakes builders from East Coast yards for new ships and conversions.

Says Impact of Steel Strikes Exaggerated

THE MUCH AWAITED Livernash Steel Report provides plenty of ammunition for legislators concerned about the government's role in key industry labor negotiations. (Prof. E. Robert Livernash of Harvard was asked to make the study by James Mitchell, former secretary of labor.)

These broad conclusions are made:

1. The effects of steel strikes on the economy have not been serious.

2. Early intervention into bargaining situations by government tends to frustrate and hinder negotiation. Late, informal, mediatory intervention has produced settlements.

3. There is little promise of anything better than the present machinery for dealing with national emergency strikes. (Professor Livernash recommends consideration of methods to keep part of the industry operating to meet defense needs for special types of steel.)

4. Steel settlements have not been a predominant independent influence in setting wage trends in the whole economy.

5. Steel prices have a minimal effect upon the economy as a whole. Competition from other materials is protecting steel consumers.

6. The major problem confronting steel management and labor is how to adjust to increasing competition from outside the industry.

7. The promise of government intervention and the exaggerated importance of steel strikes tend to make it more difficult for the parties to avoid a strike.

Professor Livernash stresses one point: Normal economic conditions will work to end a strike much sooner than any outside influence.

Kaiser Peace Panel Set Up

KAISER STEEL CORP. and the United Steelworkers of America have provided the opening wedge for the public to sit in on future labor negotiations.

The proposal: They want the Kaiser Long Range Committee, which includes public members, to be set up permanently and meet regularly to promote harmonious labor-management relations.

• **Implementation** — The proposal calls for negotiations between labor and management to start at least 60 days before a contract expires. Progress will be reviewed 30 days prior to the expiration date.

At that time, public members could be authorized to take a number of steps:

1. Take no action, pending further negotiations.

2. Attend bargaining sessions as observers.

3. Engage in mediation efforts, including private consultation with members of each party.

4. Issue a private report to the parties, with recommendations for settlement terms.

5. Issue a public report, prior or subsequent to the contract termination date.

• **Evaluation**—The procedure is not intended to replace collective bargaining, says Dr. George Taylor (University of Pennsylvania), a public member (and chairman) of the Kaiser committee. Neither the company nor the union will be bound by recommendations of public members. The purpose of the plan is to get third party assistance of an informed nature.

The aim is to assist the union and company in considering problems as they arise to minimize the reliance on contract deadline pressures.

Goldberg Supports Depreciation Reform...Changes Ahead For Right-to-Work Law?...Gag on Military Removed

WILL the Kennedy administration go into orbit around the complex problems of government, or will it fizzle out before it leaves the atmosphere of bureaucracy that so often surrounds Washington?

Action on depreciation will be one of the first indications as far as the metalworking industry is concerned. Here's the outlook:

It's apparent that President Kennedy is vitally aware of the problem. He has some of his more important cabinet members checking it out.

President Kennedy will make his decision after looking at the final analysis of the Treasury Department's depreciation survey—probably in March. (See STEEL, Jan. 16, p. 35.) Treasury boss Douglas Dillon hopes to submit a tax reform program (including depreciation) to Congress in April. It seems reasonable that the House Ways & Means Committee could start hearings by June.

Arthur Goldberg, secretary of labor, readily told the Senate Labor Committee that obsolete equipment is a fundamental and extremely serious problem of U. S. industry. He believes industry must be modernized and accepts the fact that more than $90 billion is needed for replacement. Of course, as the laboring man's representative, he warns that depreciation reform and resulting increased automation of U. S. plants must be coupled with measures to retrain and relocate displaced workers.

● **HELP FOR MINING ILLS**—Secretary of Interior Stewart Udall promises an unbiased look at the mining industry in the hope that he can come up with new policies somewhere outside the realm of protective tariffs and quotas.

● **FIRST KENNEDY GOOF?**—The solid front projected in Washington by the Kennedy team has been dented slightly. Secretary Udall precipitated a squabble in the Senate when he appointed an Eisenhower man, Floyd Dominey, as Bureau of Reclamation commissioner. The commissioner is regarded as an advocate of private power and has participated in several decisions at the bureau on the Buy American issue—they involved metalworkers who bid against foreign competitors for turbine contracts.

The secretary tried to calm the Democratic senators by saying he would make his own policy at Interior, but the point came home to observers at the hearings: 1. President Kennedy obviously O. K.'d the Dominey appointment, so any stand he takes for public power or against private power will be modified to the extent that Commissioner Dominey functions in his job. 2. The Western Democrats were mighty surprised to see the new administration adopt an Eisenhower-like policy on the power issue.

● **TAFT-HARTLEY CHANGES?**—When asked by Sen. Barry Goldwater (R., Ariz.) if he will seek repeal of Section 14B (right-to-work law) of the Taft-Hartley Act, Labor Secretary Arthur Goldberg replied: "I haven't talked to the President about it. . . I will work with him. I will invite the views of labor, management, and the public as to what is appropriate labor policy." One conclusion: The secretary did not get his job with any mandate to wreck the right-to-work laws.

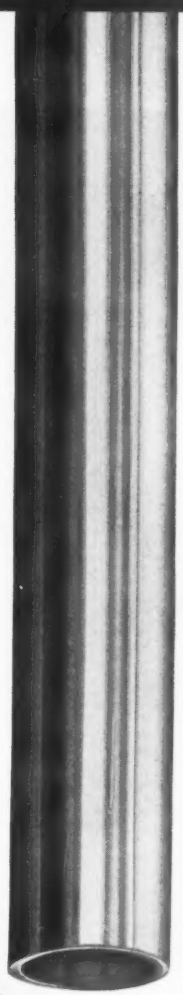
● **VOICE FOR ARMED SERVICES**—Defense Secretary Robert McNamara has promised he'll allow officers of the armed forces to speak frankly to the Armed Services and Appropriations Committees of Congress about budget problems and the strength of the nation's defenses. Under the Eisenhower administration, service officers complained that they were gagged by the White House because of a balanced budget policy.

● **DEPRESSED AREA LEGISLATION**—Look for a battle in Congress over who will control the administering agency for aid to depressed areas. That's what STEEL learned from the office of Sen. Paul Douglas (D., Ill.), sponsor of a depressed area bill (S-1). The Commerce Department wants the new agency to be part of its setup; Senator Douglas wants an independent agency. He says that will permit the effects of depressed area legislation to be felt by the economy soon—perhaps within six months. Sen. Hugh Scott (R., Pa.) told STEEL that is was impossible to predict how fast a new agency could get going because that depended upon "the zeal and capacity of the agency's staff."

● **UNEMPLOYMENT ZOOMS**—The number of unemployed workers in the U. S. rose 509,000 to a total of 4.54 million in December—representing 6.8 per cent of the work force, the Labor Department reports. It says the unemployment situation is the worst for any December since 1940 when 6.9 million jobless workers totaled 12.7 per cent of the work force. Employment in mid-December totaled 66 million, down 1.17 million from the mid-November level. Labor Department officials note that the employment decline includes about 700,000 agricultural workers. Factory employment dropped 300,000 during the month.

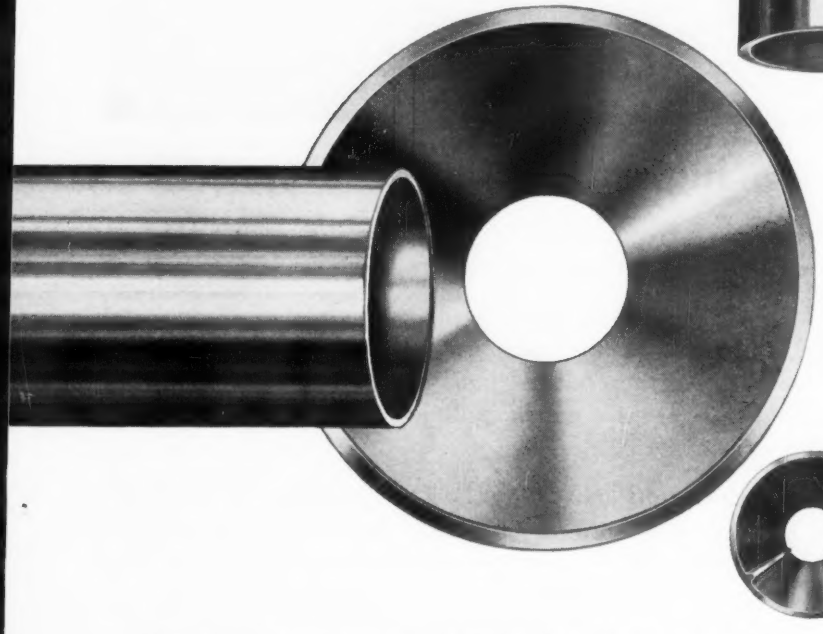
These Remarkable Precision Tubing **Finishes** and **Tolerances** are Economically Produced with the

CINCINNATI® Intraform



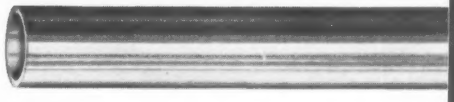
FINISHES
I.D. and O.D.
less than
10 micro inches

TOLERANCES
O.D. to ± .001″
I.D. to ± .0005″
Ovality to .0002″



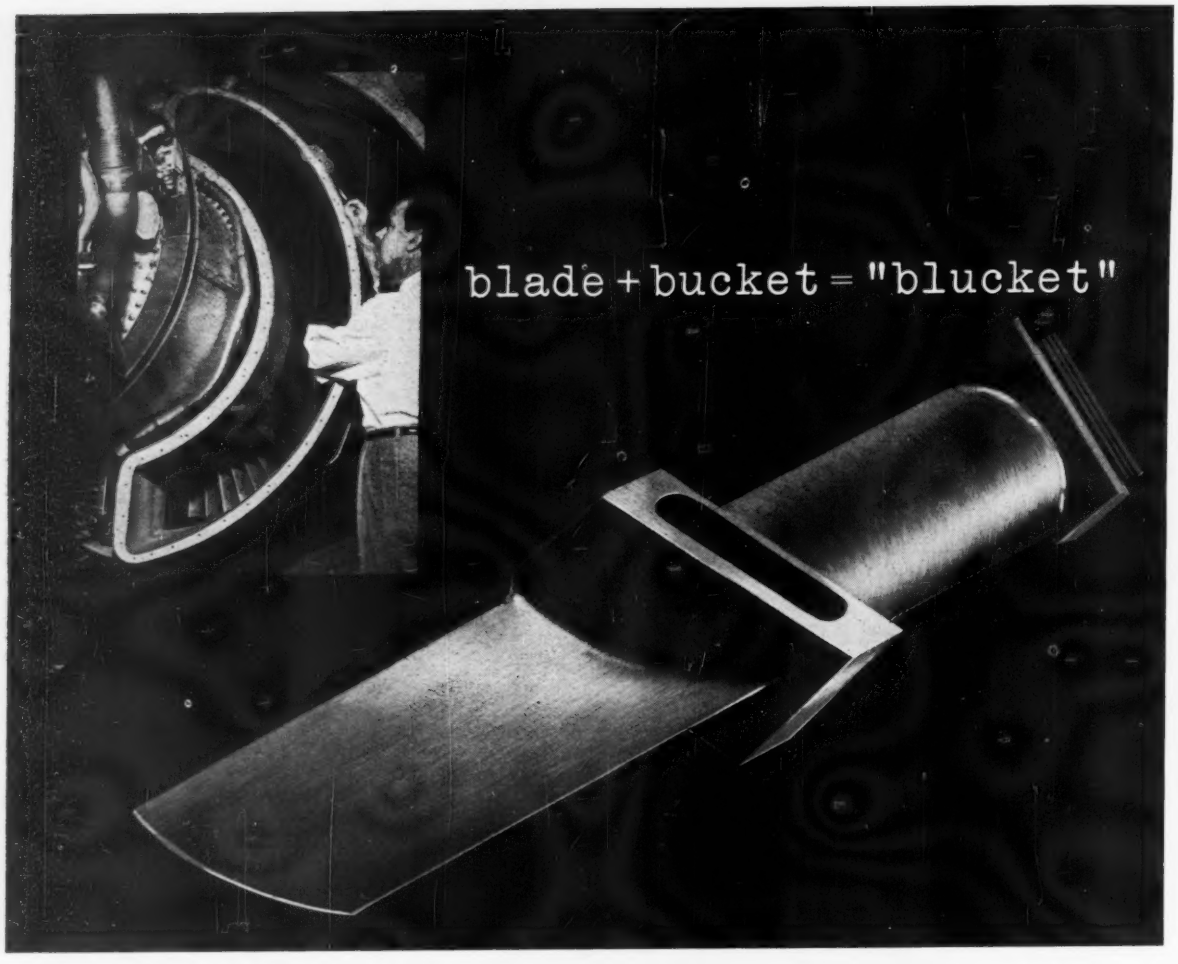
MATERIALS

Welded or seamless: Zircaloy Nos. 2 and 3, stainless alloy, and plain or carbon steels. Intraform can also produce laminated tubing of two or more dissimilar metals.



If you make or buy precision tubing, these remarkable tolerances and finishes are important to you! Visit us, write for information, or better still, let us send you a Meta-Dynamics Division Field Engineer to expertly translate Intraform into benefits you can expect from specific application to your operation.

Intraform
META-DYNAMICS DIVISION
Metal Forming and Heating Machines
THE CINCINNATI MILLING MACHINE CO.
Cincinnati 9, Ohio, U.S.A.
CINCINNATI



new design in *Carpenter* high temperature alloy V-57

Everything about this combination fan blade-turbine bucket is new except its predictable performance . . . a built-in characteristic of all Carpenter high temperature alloys.

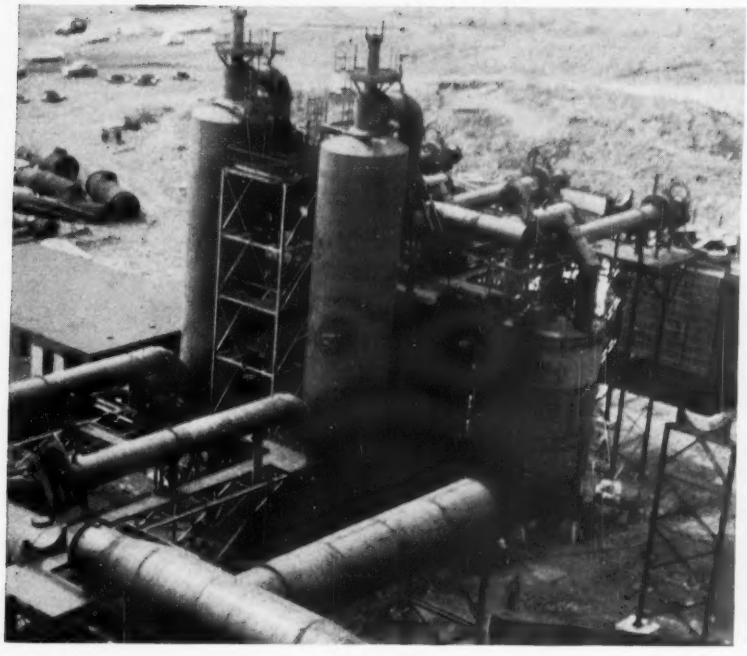
V-57 is the super alloy now used to forge this unique new jet engine component. V-57 replaced A-286 (originally used) because of its superior mechanical properties at operating temperatures. Like all Carpenter vacuum melted metals, V-57 is produced with exclusive Carpenter quality controls that permit tighter forging tolerances, better machinability and improved cold forming properties.

Carpenter's VACUMELTROL® (induction vacuum) and CONSUMET® (consumable electrode) melting processes assure you more accurate forgings with better finishes, fewer rejects, faster production . . . and, most important . . . true predictable performance in your high temperature alloy components. Ask your Carpenter Representative for details.

Carpenter steel

you can do it ***consistently*** better with Carpenter Specialty Steels for specialists

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.



Gas cleaning plant and blast furnace rise as . . .

Rhodesia Swells Steelmaking Potential

A $24 MILLION expansion program is well underway at the Redcliff Works of Rhodesian Iron & Steel Co. in the Central African Federation (CAF) which takes in Northern and Southern Rhodesia and Nyasaland.

The move will boost annual steel output to 150,000 tons, enabling Risco to economically manufacture a varied line of products for local consumption. When private interests relieved the facility from government control in 1957, production equaled 65,000 tons a year.

• **Equipment**—The new plant includes a blast furnace (capacity: 500 tons of iron a day), open hearth furnace (capacity: 200 tons of steel a day), gas cleaning plant, a holder for blast furnace gas, coke ovens, cogging mill and soaking pits, boiler house, bloom reheating furnace, and a sheet mill for black and galvanized sheets and light plates.

The blast furnace, Africa's fourteenth, will bring Risco's potential daily iron output to 750 tons, nearly treble the old rate. It will be charged with primary iron ore and sinter. (The Central African Federation yielded 130,000 tons of iron ore in 1959.) Coke will be made on the works site from coal mined at the Wankie Colliery in Rhodesia. The additional open hearth doubles steel capacity to 400 tons daily.

• **Much Local Aid**—With the exception of instrumentation and electrical equipment not yet available from local sources, much of the plant is being manufactured in the Union of South Africa and Southern Rhodesia.

To allow for industrial expansion in the area in which Risco is situated, 3000 acres have been set aside for development by the government. In this $12 million program, 77 acres are being used for Southern Rhodesia's first "model African village." More than 1800 African men and their families will occupy it.

The Central African Federation is Africa's third largest steel producer. More than 80,000 tons were turned out in 1959. The Union of South Africa poured 1.9 million tons and Egypt 100,000 tons. Total African steel output, including Egypt, was 2.1 million tons in 1959 and is expected to reach 5 million tons by 1965.

Rhodesian Chromite Plentiful

The U. S. received 52 per cent (value) of its imported chromite ore from Rhodesia and Nyasaland in the first half of 1960. The Rhodesian government estimates that chromite ore reserves total 608 million tons, of which 50 per cent is metallurgical grade, making the territory the largest Free World source of metallurgical chromite. It estimates reserves of all grades are sufficient to last 1000 years at the present rate of depletion.

Turn These Complaints into

What companies say about manufacturers' representatives . . .

1. They make more than some of our top executives.
2. They don't spend enough time on our product lines.
3. They seldom follow our company sales policies.
4. They often refuse to handle service calls.
5. They lack the kind of training our salesmen have.

What 'reps' say about companies . . .

1. They don't give us enough product information or leads.
2. They fail to advise us of new plans and products.
3. They don't tell us their over-all competitive picture.
4. They seldom give us adequate factory support on service problems.
5. They like to pit us against their own salesmen in the territory.

Manufacturers' Reps—Here's How They Can Help You

Says consultant Robert V. Benham: "Reps will naturally push the lines that are most profitable to them. Your job is to keep your products at the top of their lists."

THE BIGGEST ADVANTAGE to using manufacturers' agents is that they work on a predictable cost basis and can be used where it's uneconomical to support a full time company salesman. Biggest disadvantage: They are independent businessmen and can't be controlled as closely as your own sales staff.

Estimates vary, but companies and representatives STEEL talked with figure the average metalworking firm depends on some sort of noncompany distribution setup for 15 to 25 per cent of its gross annual sales volume. The percentage is higher for firms grossing less than $5 million annually. It's much lower for major corporations. Many producers of assembled components like electric motors or industrial pumps may rely almost entirely on agents or distributors.

With an estimated 50,000 manufacturers' representatives handling industrial products in this country, it'll pay you to spend the extra time and effort required to get the best possible individuals handling your products. Too often, representatives are chosen on a friendship basis which is difficult to sever. Snap impressions gained on a whirlwind trip by the sales manager through a territory also lead to poor rep organizations. Here are some suggestions.

Understanding the Agent

"Manufacturers' representatives are independent businessmen so they think differently and act differently than do your own salesmen—or your customers. They take pride in being beholden to no one. They have many of the same problems your management has—employment problems, taxes, unions,

Profitable 'Rep' Relationships

- **Top management must be sold on the value of manufacturers' representatives in the distribution network.**
- **Establish a written policy covering relationships with 'reps.'**
- **Support your representatives with selling, technical, promotional, and service aids.**
- **Tailor their motivation—don't use the same approach used for your salesmen.**
- **Evaluate their performance constantly; weed out the poor ones; boost the good ones.**

capital, and inventory," explains John DeWolf, vice president and research director, G. M. Basford Co., New York.

Robert V. Benham, president, Robert V. Benham & Associates, Philadelphia, emphasizes that companies must remember the agent is in business for three reasons: 1. He wants to make money. 2. He likes to be independent. 3. He likes to sell. Mr. Benham heads a management consulting firm that specializes in marrying agents and companies. He claims one of the largest listings of industrial agents in the country (35,000).

He adds: "Sales agents, particularly those representing technical or engineered lines, usually have had management experience at the manufacturing level. Many agents have been sales managers, sales vice presidents, or chief engineers. They've had from five to ten years of management experience and already have hit the medium to higher income brackets before branching out on their own. Others have gained experience by working for a sales rep organization. Such background usually produces a high caliber contact man."

Compatibility and costs are the keys to finding the correct agent to represent your firm. Unless your line has to be a top income producer for them, you can expect that it will receive time and effort in direct proportion to income from other lines. Mr. Benham asserts that many firms drop their agents because some top executive suddenly discovers that an agent's monthly commission checks total more than his salary. "He forgets that the agent has to pay for his own office, secretary, and sales expenses."

Remember that manufacturers' agents work on an established commission based on a percentage of sales. Their cost to the company can be forecast and will keep pace with sales. Factory salesmen must be trained and supported no matter which way business goes.

• **Compatibility** — Manufacturers' representatives are salesmen—not order takers. "An agent's biggest asset is his contacts. He cultivates customers who often regard him more highly than the product he sells. Generally speaking, an agent knows his territory and the people in it as no factory man can," asserts Mr. Benham. If your product needs this kind of personal salesmanship, ask yourself these questions in selecting an agent:

1. Does he have the technical knowhow and experience to sell and (if needed) service your products?
2. Will your line be one of his top income producers?
3. Are his other lines compatabile with yours? Are any of them competitive?
4. What's his reputation with his customers?
5. Should he sell all your products or just some of them?

Controlling the Agent

Unlike the factory salesman, a manufacturers' agent can't be forced to fill out call reports, make "policy" calls, or undergo specialized training. But he can be persuaded to do all these tasks. Probably the best way to win this co-operation is to give him the support he needs and wants in the field.

Another way is to set up several well trained district sales managers. Each of them can work with a

number of agents and "represent" them to the company as well as back them up on specialized service and customer problems.

• **Policies**—"It's always best to put your policies toward agents in writing," says Mr. DeWolf. He suggests written policy should cover such items as: 1. Who or what agents can sell versus who or what the company reserves for other sales staffs. 2. Are agents to have exclusive or selected territories? 3. If service and distribution are involved, spell out the policy on stocking allowances, price discounts, warranties, and obsolete stock.

• **Motivation** — "As independent businessmen, agents want respect, appreciation, and understanding. They also like to be considered as partners—albeit junior partners—in your business too. If your line is profitable for them, they desperately want to continue to be your agent," points out Mr. De Wolf. He thinks an agent council is a good device. The agents feel that they are in on company planning. You may learn something too.

Mr. DeWolf also suggests you should set sales "goals" instead of "quotas" for your representatives. Figure out what sales volume you can reasonably expect from all your marketing outlets in a territory. Then call in the agent and ask him what he would consider his fair share of this volume. Says Mr. DeWolf: "The agent will almost certainly lean to the high side. He's not likely to admit that someone else can outsell him in his territory so, in effect, he sets his own goal and therefore has a real incentive to meet it."

• **Evaluate**—There comes a time when an agent outgrows your product or when you outgrow his coverage.

That's why it's wise to evaluate performance at least once a year. Don't be afraid to replace weak agents. Charges Mr. DeWolf: "You'll win the respect of the good agents if you show that you know the difference between top notch and mediocre performance—and insist on the best."

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Meet Betty Weppner, who keeps pace with men as...

She Competes in Selling Metals

FROM skepticism to respect—that is the reaction of metal buyers after talking product with Miss Betty G. Weppner, sales representative for Brace-Mueller-Huntley Inc., Buffalo.

One of the few members of her sex to sell steel, aluminum, and brass to manufacturers and building contractors, she competes with 20 men on the sales staff. A graduate of the University of Buffalo, Miss Weppner has been with the company 11 years.

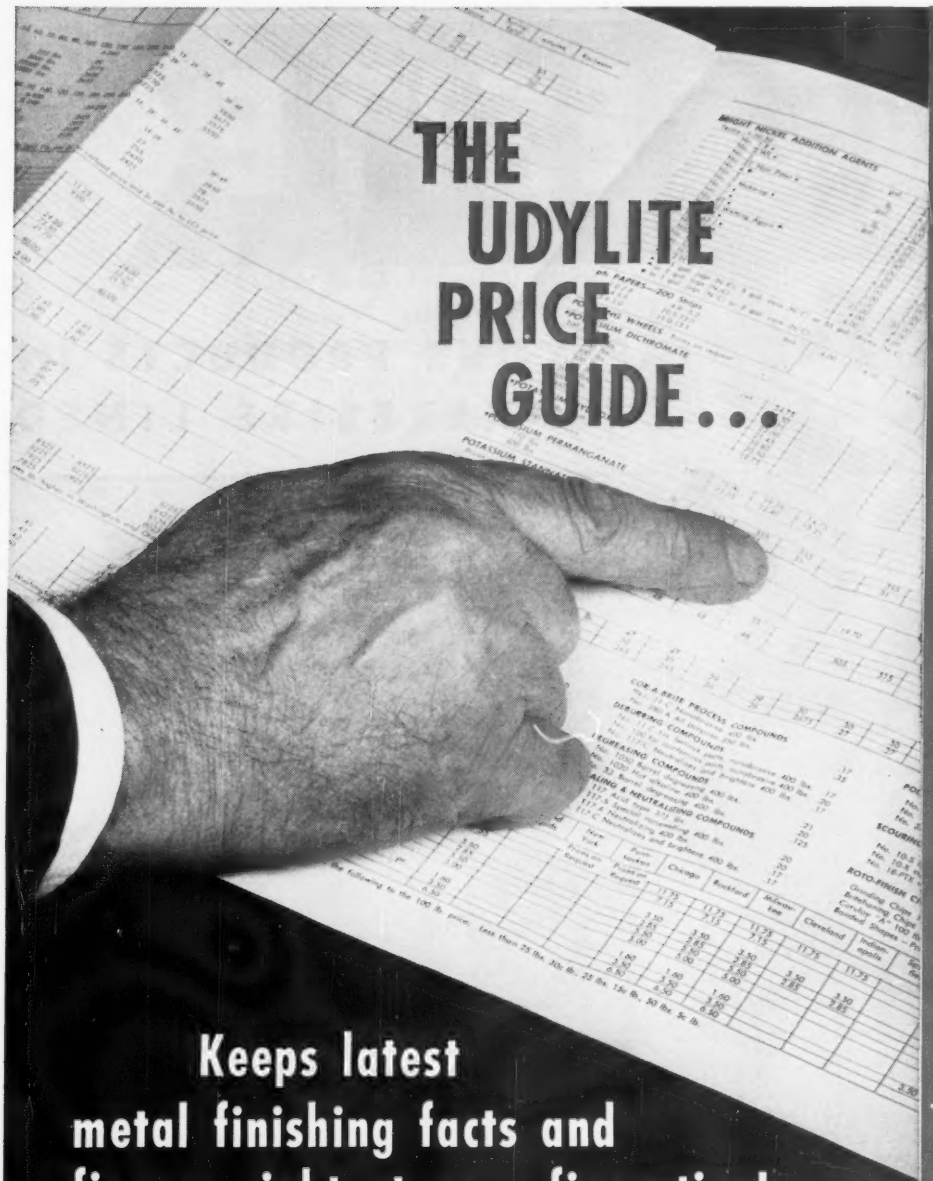
Otto W. Mueller, assistant to the president recalls: "I hired her as a sales secretary in 1948.

"Within two years her extraordinary abilities were so evident that we transferred her to our sales department."

The appearance of a woman in a field dominated by males results in some misgivings initially, but, says Miss Weppner: "Customers are wiling to deal with me after I demonstrate my familiarity with metals in such areas as chemical composition, measurement, yield and tensile strength, elongation, and bend test.

"In addition, I gain their confidence by recommending certain metals for a specific project, computing prices accurately, reading blueprints to determine their needs, and filling unusual orders through my close contacts with steel mills."

Study and research, long hours, and quick response to customer calls are requisites for the job, says Miss Weppner. For example: An evening course in nuclear energy taken in 1956 has given her an understanding of the rigid government specifications structural steel must meet when filling orders for metal used in defense.



THE UDYLITE PRICE GUIDE...

world's largest plating supplier

udylite

Keeps latest metal finishing facts and figures right at your fingertips!

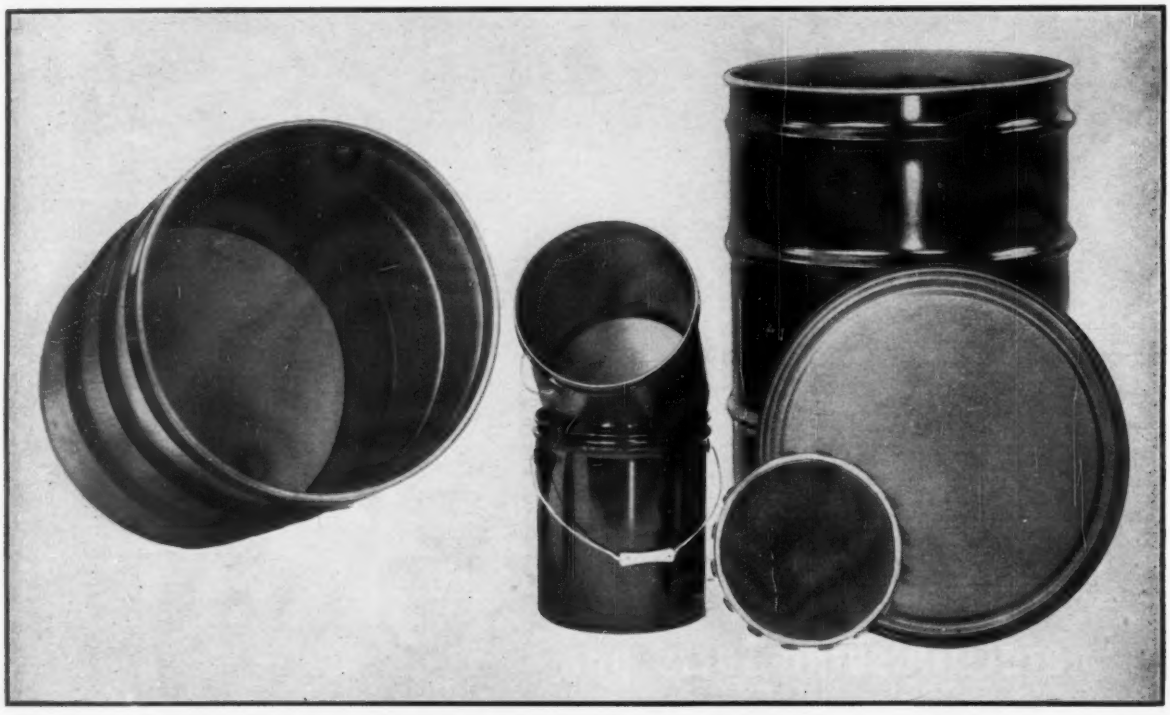
The Udylite Price Guide provides up-to-date pricing information on plating and metal finishing supplies from each of the twelve Udylite stock points. Issued bi-monthly, the Price Guide gives you valuable market trend information and news of latest plating methods and equipment. The Price Guide is another free customer service from Udylite. And, if you are not already a subscriber, we will be happy to add your name to our mailing list. Write today.

the udylite corporation
detroit 11, michigan

HERESITE

Reg. U. S. PAT. OFFICE

PACKAGE AND SHIP YOUR PRODUCTS IN STEEL CONTAINERS—HERESITE LINED



HERESITE PURE PHENOLIC LININGS ARE UNSURPASSED IN RESISTANCE TO PRACTICALLY ALL CHEMICALS, OILS, ACIDS, PAINTS, VARNISHES, LACQUERS, ADHESIVES AND SOLVENTS.

Also declared safe for food by F.&D.A. & Dept. of Agric.

HERESITE & CHEMICAL COMPANY

MAIN OFFICE & PLANT — MANITOWOC, WIS.
EASTERN WAREHOUSE — WOODBRIDGE, N. J.
EASTERN SUBSIDIARY
GENERAL COATING, Inc. — WOODBRIDGE, N. J.

Canada: Dominion Rubber Company, Ltd.
Montreal, Quebec

Europe: Aluminium-Schweisswerk A. G.
Schlieren-Zurich, Switzerland

GM's President F. G. Donner stresses need for continued emphasis on innovation and quality to meet foreign competition, as . . .

SAE Show Goes International

FOREIGN automakers were thunderstruck by remarks of John Gordon, General Motors Corp. president, keynote speaker at the Society of Automotive Engineers' first international congress last week in Detroit.

Pointing out that the quality of U. S. cars is steadily increasing and will improve even more, Mr. Gordon urged: "It is high time for us to scotch forever the myth of European superiority in product quality. Most European manufacturers today use the same assembly line techniques we do."

Mr. Gordon continued: "To meet this foreign technical challenge . . . we must step up our productivity. Increased automation is imperative. We have no choice if we wish to survive in today's industrial society!"

Mr. Gordon also voiced strong resentment over the charge that the U. S. auto industry is abdicating its leadership and is moving abroad. His remarks indicated clearly that Detroit will fight to maintain leadership in quality, design, and productivity in the world market.

He asserted: "The challenge to our industrial superiority coming from abroad cannot be met by moving American operations out of the country. In General Motors, we have no intention of doing this. On the other hand, we make no apologies for being an international corporation. It is my belief that world tensions would be substantially eased if there were more international corporations both here and abroad."

In a final blast at "hair shirt philosophers" who cry the U. S. is sacrificing social benefits for personal goods, and who would urge more government control over our lopsided productive efforts, Mr. Gordon declared: "We must demonstrate to the world that the free enterprise system can be more creative than any other—not only that it can create more and better material goods and services, but that it also can create the purchasing power to absorb this output while at the same time producing as a byproduct more social goods and services than any other economic system."

Foreign representatives and the "hair shirt philosophers" left quietly.

The SAE show attracted a record crowd of 21,000. Listening to speeches and corridor conversations, it was evident that many were ready to follow Mr. Gordon into the fight.

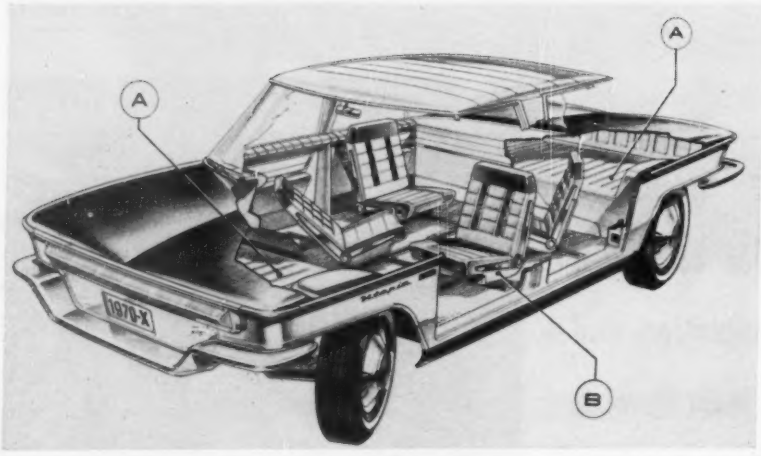
Powerplants Get Attention

Dr. Walter Froede, NSU Motorenwerke, Neckarsulm, Germany, discussed the much talked about Wankel engine which Curtiss-Wright has licensed for this country. The rotating, combustion powerplant offers few moving parts and theoretically will provide an extremely effective power to weight ratio.

But U. S. engineers were quick to point out that efficiency is questionable at the high output levels needed for car propulsion. They also claim that efficient sealing and lubrication systems for the single rotating piston apparently have not yet been developed. So far only a few test engines have been built.

Summarizing the future of other types of powerplants, John S. Wintringham, research engineer in Detroit for Ethyl Corp., reported: "Diesel engines have a place in trucks, buses, earth moving equip-

(Material in this department is protected by copyright, and its use in any form without permission is prohibited.)



FUEL CELL POWERED CAR OF THE 1970s (the Utopia), as envisaged by Brook Stevens, Milwaukee industrial designer. Bulky transmission units and engines will be eliminated. (The powerplant will be in the skin of the vehicle.) "A" and "A" are luggage compartments; seats ("B") are fully adjustable for location anywhere in the car. Springs and foam will give way to sealed seat cushions filled with high viscosity silicon fluid. For simplicity of construction, several body components will be identical: Front and rear bumpers, front and rear end panels, all doors, front and rear luggage hoods

ment, military vehicles, and locomotives." He said he thought gas turbines could be used for similar purposes, but added that free piston engines weren't apt to appear in Detroit products, being best suited to ships and locomotives. He forecast that high cost, limited driving range, and recharging problems would curtail the use of battery power for most vehicles, although he conceded they might work for small second cars. "Fuel cells may be used in fork lift trucks and eventually in space vehicle applications," he concluded.

Materials Battle Gets Hotter

While continuation of present engines seems assured for the next decade, the big question appears to be whether they will have aluminum or gray iron blocks and heads.

Engine designers at the SAE show reported that aluminum engines on the road work well, but they admitted there have been machining and leakage problems.

But the problems are being solved and the designers said that the decision to build more aluminum engines would depend on how well car buyers like the present jobs and whether future designs would be competitive costwise with other metals. Commented J. D. Turlay, Buick Div.'s director of powerplant activities: "There seems to be little doubt that diecasting is the most inexpensive way to make aluminum blocks. We used semipermanent molds because it was the safest for our program. Unlike AMC and Chrysler we had no other small engines to back up our aluminum V-8."

• **New Designs** — Designers are looking closely at ways to redesign existing gray iron blocks so they'll remain competitive. Nodular iron is being tried to see if it will permit thinner wall sections and lighter weight. As STEEL reported earlier (Dec. 19, 1960, p. 87), Chevrolet is readying a new family of gray iron engines for 1962 and 1963. Corridor tipsters gave this lineup:

Cylinders and Type	Displacement (Cubic inches)
4 in line	153
6 L head	194
6 L head	229
V-8	327
V-8	409

More Models on the Way

Although Chevrolet can't confirm or deny reports about its H-35 car which will be introduced for the 1962 season, it's understood that the 2700 lb, 114 in. wheel base vehicle is being developed to replace the lower series of standard sized Chevys by 1963. It will use at least three of the new engines. A full complement of accessory equipment, including power brakes, steering, and seats, has been programed. A transaxle is being debated. The car will contain some 800 lb less steel than the Impala. Initial assembly is slated for Framingham, Mass.; Oakland, Calif.; Kansas City, Mo.; and Willow Run, Mich. It may also move in to share Buick-Oldsmobile-Pontiac facilities at Arlington, Tex.

With volume programed at less than 500,000 units, it's evident that Chevrolet is moving to accomplish what sister divisions already have done—build several different sized cars on the same assembly lines. By 1963, Chevrolet will have a lineup of 108, 114, and 119 in. wheel base cars. It's not expected to introduce a tiny car, although such a compact compact is on the shelf. Ford, however, is expected to be competing with a 105 in. model. It will offer 105, 109, 115, and 119 in. jobs. Its Canadian X car already is committed for assembly at four plants.

U. S. Auto Output

Passenger Only

	1960	1959
January	688,731	545,756
February	659,323	478,518
March	654,242	576,080
April	582,909	578,846
May	611,226	546,817
June	613,147	557,995
July	434,377	555,410
August	305,527	239,152
September	407,685	258,151
October	617,816	507,527
November	597,132	254,527
December	522,239	494,931
Totals	6,694,354	5,593,707

Week Ended	1960	1959
Dec. 17	130,711	152,449
Dec. 24	114,941	103,219
Dec. 31	86,497	112,113
	1961	**1960**
Jan. 7	74,204	163,249
Jan. 14	111,424†	173,713
Jan. 21	112,000*	175,060

†Preliminary. *Estimated by STEEL.
Source: *Ward's Automotive Reports.*

another chapter
in the
BIRDSBORO
QUALITY
STORY

SOUND ROLLS...
THROUGH SOUND WAVES

Internal flaws can't hide in Birdsboro rolls. Ultra-high frequency sound waves — from a reflectoscope — search them out. The result? Assured internal soundness, in every inch of every Birdsboro roll.

Quality control like this is one reason Birdsboro rolls last longer. We'll be happy to tell you the others. Just write: *Sales Department, Engineering Department and Mfg. Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.

R-32-60

BIRDSBORO
CORPORATION BIRDSBORO, PENNA.

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • ROLLS • ELECTRIC STEEL CASTINGS: Carbon, Low Alloy and STAINLESS STEEL

New from Wright!

Built-In Overload Protection for Operator, Load and Hoist with the New Wright Overload Cutoff*!

• Now, for the first time on any electric hoist, you can have safe, sure,mechanical overload protection as a built-in feature with the **WRIGHT Overload Cutoff.** Designed and built to fit any new WRIGHT *Speedway* Electric Hoist, the Overload Cutoff unit you see pictured above is a compact, integral part of the hoist frame itself. As a result, it becomes a functional part of the hoist *at no sacrifice in headroom.* The WRIGHT Overload Cutoff is simple in design and should give dependable, trouble-free operation during the entire life of the hoist under normal operating conditions. Calibrated and sealed at the factory for the user's protection, the unit takes rugged abuse up to the critical point of overload—then instantaneously "breaks" the raising circuit of the hoist. This allows the load to be safely lowered to the floor and unhooked. Once this is done, the raising circuit of the hoist is again automatically restored.

The WRIGHT Overload Cutoff is available now as standard equipment on all new WRIGHT Frame 2 & 3 *Speedway* Electric Hoists, and as optional equipment on new Frame 1 & 1½ models.

Find out how WRIGHT *Speedway* Hoists equipped with Overload Cutoff can bring practical, fast-acting overload protection to your material handling operations. For complete information, write our York, Pa., office.

*Patent applied for

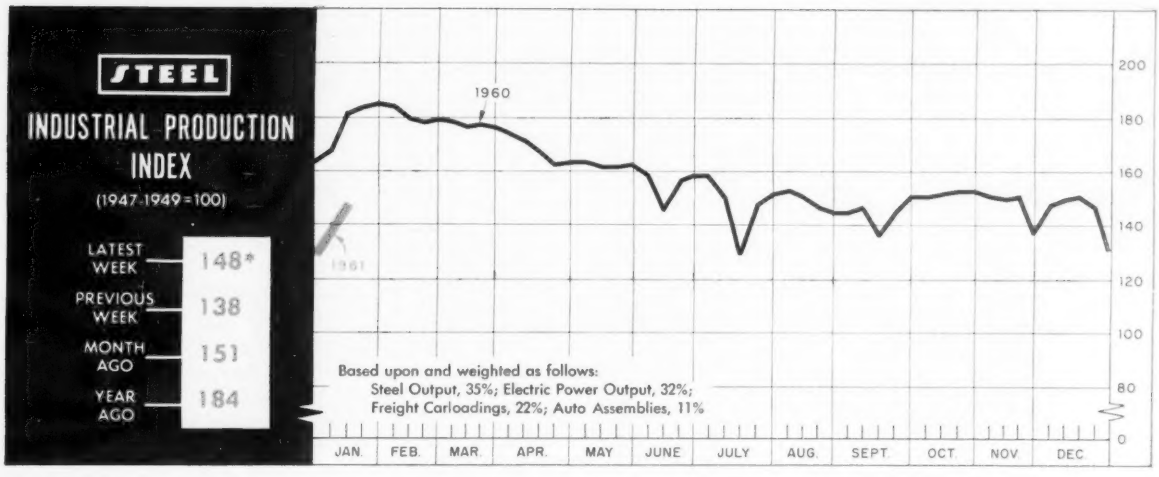
See your WRIGHT Distributor *about the Speedway Electric Hoist line or write us for Catalog E-58*

WRIGHT HOISTS

Wright Hoist Division • American Chain & Cable Company, Inc.

York, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

ACCO



*Week ended Jan. 14.

Index Rebounds from Holiday Slump

STEEL's industrial production index in the first two weeks of 1961 has at least one thing in common with its 1960 counterpart: Direction. In addition, the latest preliminary reading of 148 (1947-49 =100) has the same numerals as the year-ago reading, but the similarity ends there. The 1960 figure (184) was 36 percentage points higher.

There are two reasons for the unusually wide spread between the two lines in the graph above: 1. The nation's economy, especially the hard goods sector reflected by STEEL's index, is in a recession. 2. The year-ago period was abnormally high—many economists term it a "false record" because of the rebound from the 1959 steel strike.

● **Normal Trend**—The sharp rise in the trend line above is a normal postholiday occurrence and, by itself, should not be interpreted as a bullish sign. Look at the last eight years: The 7 per cent gain nearly equals the average rebound, and it tops the preholiday level. (In 1954, 1955, and 1958 it failed to do so.)

But don't expect the uptrend to continue. The index is influenced by seasonal factors during the first quarter which almost always push it down. In addition, further weakening in the economy, continuing into the second quarter at least, is expected. So the 1961 trend line will probably follow the same general pattern as the 1960 version, though at a much lower level.

● **Causes**—The first quarter is almost always a slowing down period for output of electricity and railroad freight carloadings. This year will be no exception. Exceptionally cold weather could moderate the decline in power output, but it could not overcome the lag in industrial use. The nation's shippers have advised the railroads that carloadings this quarter will be 5.1 per cent below those of the corresponding 1960 period. The biggest declines, naturally, will be in steel and related products.

But the biggest deterrent in the next two months or so will be the auto industry. In the first ten days of January, dealers delivered an average of only 14,970 cars a day, down 16 per cent from December's so-so rate. It was one of the lowest figures for that period in recent years. Add to that the equally disturbing increase in inventories (more than 1 million on Jan. 10), and the result is a cutback in production. Unless production is stepped up considerably in the last half of the month, this could be the industry's slowest January since 1952, the Korean War year.

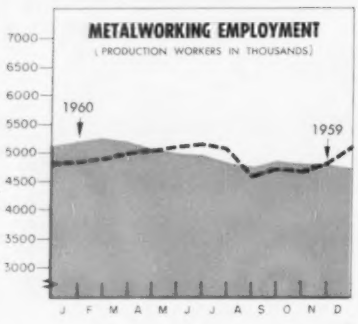
● **Steel Outlook Brightens** — The only encouraging segment of the index is the steel industry. Production last week (ended Jan. 22) rose to the highest level since the last week in October. STEEL estimates output at 1,525,000 net tons, a slight improvement over the 1,482,000 tons reported by the American Iron & Steel Institute for the week ended Jan. 14. It could be that the steel industry has the worst part of its recession behind it.

FRB Index Continues Downward

As anticipated by many economists, the Federal Reserve Board's industrial production index dropped another 2 points in December to 103 per cent of the 1957 average. Causes: Manufacturing cutbacks to pare inventories and bad weather. The two greatest contributors to the slowdown: Steel and autos.

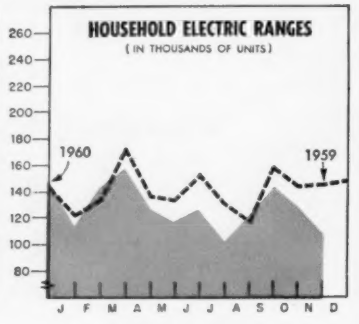
The January level of the FRB index is not clearly forecast by STEEL's index, as has been the case during recent months. Because of the manner in which our trend line responded to the post-

THE BUSINESS TREND



1959	Prim. Mtls.	Fab. Prod.	Mach-inery	Elec. Mchy.	Trans. Equip.
Dec.	1,036	841	1,166	892	1,172
1960					
Jan.	1,048	857	1,179	892	1,239
Feb.	1,052	863	1,191	890	1,245
Mar.	1,043	954	1,186	879	1,221
Apr.	1,020	837	1,176	860	1,187
May	993	836	1,159	855	1,174
June	970	840	1,154	859	1,127
July	924	817	1,130	850	1,105
Aug.	910	819	1,112	861	1,036
Sept.	905	835	1,104	877	1,135
Oct.	891	834	1,087	839	1,149
Nov.	871	816	1,087	867	1,153
Dec.	855	801	1,075	854	1,139

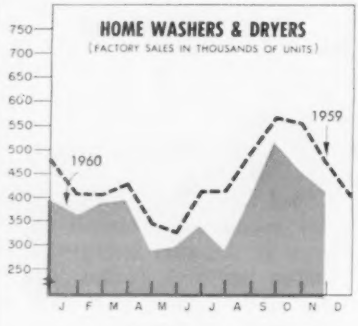
U. S. Bureau of Labor Statistics.



Total Factory Sales—Units

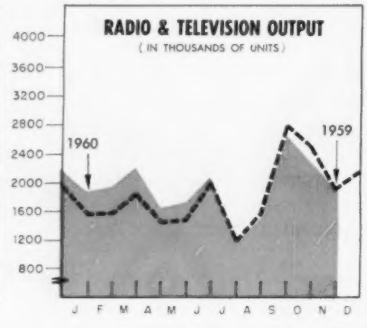
	1960	1959	1958
Jan.	113,500	120,800	109,000
Feb.	143,200	134,600	108,700
Mar.	156,400	172,600	117,900
Apr.	127,000	136,100	95,600
May	117,600	133,400	96,000
June	126,200	151,400	116,800
July	102,100	129,200	98,500
Aug.	122,400	116,600	81,400
Sept.	142,800	157,200	122,300
Oct.	127,900	143,400	135,100
Nov.	117,500	144,000	129,100
Dec.	.....	147,500	144,000
Totals	.....	1,686,800	1,354,400

National Electrical Mfrs. Assn.



	Washers 1960	Washers 1959	Dryers 1960	Dryers 1959
Jan.	254,565	288,491	111,603	118,220
Feb.	283,640	297,826	108,367	106,274
Mar.	305,635	329,668	90,205	98,434
Apr.	235,828	274,372	53,213	67,752
May	243,943	277,934	53,700	45,903
June	276,955	341,894	64,950	70,838
July	217,655	318,063	72,580	95,248
Aug.	296,499	359,849	105,119	133,197
Sept.	352,711	394,112	165,508	174,560
Oct.	305,808	374,135	151,921	179,669
Nov.	275,301	312,796	142,049	157,047
Dec.	.....	264,236	.....	134,633
Totals	.....	3,833,376	.....	1,381,775

American Home Laundry Mfrs. Assn.
Charts copyright, 1961, STEEL.



	Radio 1960	Radio 1959	Television 1960	Television 1959
Jan.	1,356	1,125	526	437
Feb.	1,442	1,125	503	460
Mar.	1,668	1,348	550	494
Apr.	1,230	1,040	423	389
May	1,277	1,040	442	432
June	1,551	1,430	519	571
July	890	829	269	350
Aug.	1,048	1,009	462	547
Sept.	1,945	1,981	679	808
Oct.	1,728	1,796	500	707
Nov.	1,469	1,316	430	561
Dec.	....	1,553	...	593
Totals	....	15,622	...	6,349

Electronic Industries Association.

holiday stimulus, there is reason to believe that the FRB index could be 102 or remain at 103. But much will depend on which has the most influence over the remainder of the month—the more than seasonal decline in auto production, or the greater than seasonal rise in steelmaking.

Consensus Forecasts Saucer

The Federal Reserve Bank of Philadelphia reports that its compilation of business forecasts for 1961 indicates a shallow, saucer shaped movement, with the overall increase being insufficient to keep unemployment from remaining fairly high.

From peak to trough, gross national product will be down less than 1 per cent compared with 2.7 per cent in the 1953-54 recession and 3.6 per cent in the 1948-49 and 1957-58 recessions. The consensus: For the year, GNP will total $512 billion; the FRB index will average 105 (1957=100).

The bank compares the forecast with the one for 1958. (Made at a comparable period in the business cycle, it underestimated the seriousness of the 1958 slowdown.) "To the extent that this is a reliable guide, it suggests . . . that forecasts for 1961 may be on the high side. This possibility is further reinforced by the likelihood that the economy is departing more and more from conditions affecting the postwar business cycle. Fundamental changes, such as excess productive capacity, satisfaction of many consumer demands, shifts in the composition of population and consumer wants, and the changed position of the U. S. in the world economy may be playing a greater role this time."

Contracts Continue Strong

However, by springtime at least one factor (construction) will be exerting a heavy upward force. The backlog of work is growing at a rapid pace, judging from the reports on contract awards. *Engineering News-Record* declares that more than $1 billion of new heavy construction projects were posted in the first two weeks of 1961, a gain of 59 per cent over the year-ago period. Thus the trend that started about midway through 1960 continues and should show up in construction expenditures in the near future.

Another Gain for Plastics

Competing materials have been making inroads into steel markets over the last few years. The annual summary from the Society of the Plastics Industry Inc. offers documentation. The society is predicting a 5 to 10 per cent increase in production of plastics materials this year, following a 5 per cent gain in 1960 and a whopping 30 per cent boost in 1959. If the forecast is realized, the growth of this

industry in the last nine years will be 177 per cent.

And the industry shows no inclination to slow down. In a special survey, over half of the responding members plan to expand capacity.

Production in 1961 will rise to 3.2 million tons.

BDSA Reports Optimistic

If you are looking for good news for the metalworking industry, try reading the annual forecasts released by the Business & Defense Services Administration. The agency has been accused of withholding some of these reports because of the furor it created when it said auto production will drop to 5.8 million units this year. The latest batch sounds a different note.

Out of 13 industries, nine are expected to post gains—though moderate—over 1960. The worst that can be said of any of the other four is that "the steel shipping container industry) does not expect total business to increase in 1961 over 1960, although gains in the use of the new lighter weight containers are foreseen."

On the plus side, photographic products are expected to continue the modest upward trend in 1960. Aid conditioning and refrigeration equipment will show a 5 per cent gain as it did in 1960. Manufacturers' shipments of automatic vending machines may beat the 1960 record of $135 million. The boating industry will continue its growth in 1961 after slowing some last year. New orders booked by the steam turbine industry in the last two years will keep shipments rising in 1961.

Production of aluminum foil packaging will be equal to or slightly better than the 1960 total. Shipments of aluminum itself will be the same as or better than last year's. An increase in number of wells drilled (from 45,880 to 47,000) and increased footage of hole drilled (from 192 million ft to 194 million) will boost factory shipments of oil field equipment and machinery. Shipments of electrical transmission and distribution equipment in 1961 will slightly exceed those of 1960.

In the "about the same" category, BDSA lists construction machinery and equipment, steel forgings, and nickel.

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	1,525[1]	1,482	2,727
Electric Power Distributed (million kw-hr)	14,700[1]	14,245	14,236
Bituminous Coal Output (1000 tons)	6,970[1]	6,615	9,000
Crude Oil Production (daily avg—1000 bbl)	7,150[1]	7,165	7,146
Construction Volume (*ENR*—millions)	$623.9	$407.4	$415.6
Auto, Truck Output—U. S., Canada (*Ward's*)	139,618[1]	97,075	214,080
TRADE			
Freight Carloadings (1000 cars)	480[1]	439	606
Intercity Truck Tonnage (changes from year ago)	+6.2%	+5.5%	+8.6%
Business Failures (Dun & Bradstreet)	265	276	242
Currency in Circulation (millions)[2]	$32,637	$32,849	$32,282
Dept. Store Sales (changes from year ago)[2]	−11%	+4%	+9%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$30,161	$30,234	$25,522
Federal Gross Debt (billions)	$290.0	$290.2	$292.4
Bond Volume, NYSE (millions)	$35.3	$21.3	$27.7
Stocks Sales, NYSE (thousands of shares)	22,227	14,363	17,681
Loans & Investments (billions, adjusted)[3]	$110.4	$110.4	$103.9
U. S. Govt. Obligations Held (billions)[3]	$30.2	$30.2	$27.0
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[5]	214.4	215.7	233.7
All Commodities[6]	119.6[1]	119.6	119.2
Commodities Other than Farm & Foods[6]	127.9[1]	127.9	128.7

*Dates on request. [1]Preliminary. [2]Federal Reserve Board. [3]Member Banks, Federal Reserve System. [4]1935-39=100. [5]1936-39=100. [6]Bureau of Labor Statistics Index, 1947-49=100.

Number One in

Music Spring Wire

- stock list available upon request

NEW ENGLAND HIGH CARBON WIRE CORP.

MILLBURY, MASSACHUSETTS

Offices and warehouses: Cleveland, Detroit, Los Angeles, Melrose Park (Chicago) and Millbury

MEN OF INDUSTRY

JOHN V. McGUIRE
A-C Pittsburgh gen. mgr.

FRANK W. KAY
Fischer & Porter purchasing

JOHN H. NELSON
Kropp Forge exec. v. p.

W. J. TOPMILLER
P. R. Mallory purchasing

John V. McGuire was appointed general manager, Pittsburgh Works, **Allis-Chalmers Mfg. Co.** He succeeds **D. A. Griffith** who had served in the post since 1954 and asked to be relieved. Mr. McGuire was assistant general manager.

Frank W. Kay was made director of purchasing, **Fischer & Porter Co.**, Warminster, Pa. **William T. Blake** was made assistant chief of production engineering.

Robert B. MacDonald was made vice president-sales, **Valley Metal Products Co.**, Plainwell, Mich. He was Midwest sales manager for Alwintite Div. of General Bronze Co.

Keith H. Brannan was appointed purchasing agent for **Colorado Fuel & Iron Corp.'s** Pacific Coast Div.

Gene E. Zinniger was made executive vice president of **Ormet Corp.**, New York, and **John J. Miller** was made general manager of its Reduction Div.

Ronald J. Hurley was made general manager, **Acoustica Div.**, Acoustica Associates Inc., Los Angeles.

J. Robert Simpson, general sales manager, was elected a vice president of **Conoflow Corp.**, Philadelphia.

Robert A. Trumpis was elected vice president-manufacturing, **Minneapolis-Moline Co.**, Hopkins, Minn., and its divisions and subsidiaries. He was executive assistant to the vice president - maunfacturing at Norair Div., Northrop Corp.

John H. Nelson was named executive vice president of **Kropp Forge Co.**, Chicago. He became vice president-sales last August. Prior to that, he was works manager and vice president-manufacturing.

E. N. Wrenshall was elected vice president of **Kerotest Mfg. Co.**, Pittsburgh. He joined the firm in 1946 as director of purchases, and in 1958 was made general manager.

William W. Brooks was appointed general manager of sales, **Wheeling Steel Corp.**, Wheeling, W. Va., effective Feb. 1. He was Atlanta district sales manager.

Walter H. Powell, vice president-industrial relations for **International Resistance Co.**, Philadelphia, was appointed the firm's vice president-operations. He continues responsibility for industrial relations.

Fred J. Killmeyer Jr. was elected president of **Union Chill Mat Co.**, Saxonburg, Pa. He joined the firm in August as general manager.

Carondelet Foundry Co., St. Louis, appointed **John H. Culling** executive vice president; **A. W. Gruer Jr.** vice president-marketing.

Sherman B. Burke was appointed vice president-sales, **Hanna Furnace Corp.**, Buffalo, subsidiary of National Steel Corp. He succeeds **C. R. Welles**, retired. **Roger S. VanDerKar** was made general sales manager to succeed Mr. Burke. **Alden W. Gallup** was named Detroit district sales manager.

W. J. Topmiller was made director of purchasing at **P. R. Mallory & Co. Inc.**, Indianapolis. He succeeds **George C. Mercer**, retired. Mr. Topmiller was purchasing director for Mallory Metallurgical Co., a division. He now co-ordinates purchasing of the 11 manufacturing divisions of Mallory.

Elven R. Davis was named general manager, Pacific Coast operations, **Bliss & Laughlin Inc.** He is in Los Angeles. He was Northwest general manager, Sierra Drawn Steel Div., and continues Northwest operations.

Harold R. Stephan was made managing director of **Republic Steel Corp.'s** International Projects Div., New York. He succeeds **David H. Bellamore. C. B. Pharo Jr.** was made Republic's assistant general sales manager, Cleveland general offices, and is succeeded as district sales manager in Birmingham by **John Tope.**

Joseph Hauf was named to the new post of technical director-engineering for **E. W. Bliss Co.**, Canton, Ohio. Mr. Hauf and his staff will be associated with the company's administrative offices, which move this spring from Canton to Pittsburgh. He was chief engineer, Canton Div.

John T. McGraw was made director of engineering, **Vard Div.**, Royal Industries Inc., of Pasadena, Calif.

M. B. Sennet was made assistant to the vice president, **De Laval Steam Turbine Co.**, Trenton, N. J. **Donald**

T. Bixby was made manager of the IMO Pump Dept.

Donald W. Farrow was made director of sales, **Beals McCarthy & Rogers Inc.**, Buffalo.

Robert S. Sherman was made chief engineer, **Carolina Steel Corp.**, Greensboro, N. C.

Howard Blank was made sales manager for OFHC brand copper and OFHC alloys produced by Amco Div., **American Metal Climax Inc.**, New York.

Robert A. Bechtold was made assistant superintendent, open hearth and electric furnaces, at the Gadsden, Ala., plant of **Republic Steel Corp.** He was at the Massillon, Ohio, plant. **J. H. Ziegler** was made superintendent, Sheet & Tin Dept., Warren, Ohio, plant.

J. W. Frasor was made assistant to the vice president-sales, **Northwestern Steel & Wire Co.**, Sterling, Ill.

Pall Corp., Glen Cove, N. Y., named **Norman Friedman** manager of purchasing, and **Howard E. Abrams** laboratory manager.

George E. Spaulding Jr. was named to the new post of vice president-engineering, Photo Products Div., **Bell & Howell Co.**, Chicago. For the last 12 years, he was with Electric Autolite Co.

W. D. Bryson was elected a vice president of **Solar Aircraft Co.**, San Diego, Calif., subsidiary of International Harvester Co. He will coordinate engineering and production. He was manager of manufacturing research at Harvester.

EDGAR W. BLIEK ALFRED J. MURRER DONALD L. WHITMORE

head new Gleason Works manufacturing divisions

Gleason Works, Rochester, N. Y., established new manufacturing divisions. **Edgar W. Bliek** was named manager of the new Foundry & Metallurgy Div. (foundry and sheet metal, heat treat, and plating departments). **Alfred J. Murrer** (assistant factory manager) directs the new Machine Div. (machining and assembly departments). **Donald L. Whitmore** heads the new Arbor, Cutter & Gear Div. **Arthur G. Matthies** (chief industrial engineer) heads the new Industrial Engineering Div.

John C. Conley Jr. was made sales manager, **Zurbach Steel Corp. of Connecticut**, Southington.

Jack E. Cooper was elected vice president of **Diamond Chain Co. Inc.**, Indianapolis, subsidiary of American Steel Foundries. He heads sales operation of the company.

Joseph E. Callahan was made vice president-sales, **Huck Mfg. Co.**, Detroit. He was commercial vice president in charge of sales at Cleveland Pneumatic Tool Co.

Perry W. House was made works manager, **Delco-Remy Div.**, Anderson, Ind., General Motors Corp. He succeeds **Robert L. Kessler**, recently made works manager, Buick Motor Div. **J. Stewart Garlic** was made manufacturing manager of Delco's ten Anderson plants. He is replaced by **John B. Harrison** as manufacturing manager of Delco's four battery plants.

Lester T. Yeager was promoted to general sales manager, **Textile Machine Works**, Reading, Pa. He was manager, Wire Products Div.

Ralph F. Gow was elected president of **Norton Co.**, Worcester, Mass., to succeed **Milton P. Higgins**, now chairman. Mr. Higgins succeeds **George N. Jeppson**, who remains on the board with the title of honorary chairman. **John Jeppson** succeeds Mr. Gow as executive vice president, and is replaced as vice

W. D. BRYSON
Solar Aircraft v. p.

JACK E. COOPER
Diamond Chain v. p.

JOSEPH E. CALLAHAN
Huck Mfg. sales v. p.

RALPH F. GOW
Norton Co. president

J. W. PALMER

R. D. CRITZER

promoted at H-P-M Cast-Master Div.

LEO D. DUNLAP

WILLIAM SCHANO

Edgewater Steel appointments

president-general manager, Abrasive Div., by **Robert Cushman.**

J. W. Palmer was promoted to general manager, and **R. D. Critzer** to sales manager of **Hydraulic Press Mfg. Co.'s Cast-Master** operation at Bedford, Ohio. H-P-M is a division of Koehring Co. Mr. Palmer was sales manager. Mr. Critzer was with Onsrud Machine Works Inc.

William Kramer was made assistant sales manager of **Groov-Pin Corp.**, Ridgefield, N. J.

James S. Hitchman was made sales manager, **Rigidized Metals Corp.**, Buffalo.

Harmon Cutler was promoted to plant manager by **Cal-Metal Pipe Corp. of Louisiana**, Baton Rouge.

Robert O. Braeutigam was appointed chief engineer of **Link-Belt Co.'s** Caldwell plant in Chicago. He succeeds **David A. Davis**, transferred to executive offices for special engineering projects.

Edgewater Steel Co., Pittsburgh, appointed **Leo D. Dunlap** general superintendent, and **William Schano** purchasing agent. Mr. Dunlap, former superintendent of manufacturing, assumes some of the duties previously held by **R. M. Heyl**, retired. Mr. Schano succeeds **L. W. Engel**, also retired.

Dow Chemical Co., Midland, Mich., established a new corporate purchasing function under direction of **David C. Baird**, director of purchases. He is responsible for direction of procurement for Dow, its divisions and subsidiaries (dometic and foreign). Mr. Baird has been company pricing administrator since 1950, and last June was named assistant secretary and assistant treasurer.

Consolidated Electrodynamics Corp., Pasadena, Calif., subsidiary of Bell & Howell Co., combined its DataTape Div. and Electro Mechanical Instrument Div. into a single organization known as the **Data Recorders Div. Henry S. Black**, director of the DataTape Div. for the last two years, was named general manager of the new division.

Robert P. Hanagan was made assistant superintendent, wire mills, Pueblo, Colo., plant, **Colorado Fuel & Iron Co.**

A. Oram Fulton Jr. succeeds **Frederick H. Lovejoy** (now chairman) as president of **Wheelock, Lovejoy & Co. Inc.**, Cambridge, Mass.

Jeffrey T. Walkden joined **Atlantic Steel Co.'s** Warehouse Div., Atlanta, as stainless and aluminum products sales manager. He was with Peter A. Frasse & Co. Inc.

Olaf Halvorsen was promoted from treasurer to vice president of **American Steel & Aluminum Corp. of Massachusetts**, Cambridge. He is also general manager.

Paul Ewbank was named first vice president and assistant general manager of **Union Steel Products Co.**, Albion, Mich. **Leonard Butters,**

ROBERT O. BRAEUTIGAM

Link-Belt plant chief eng.

DAVID C. BAIRD

Dow Chemical purchasing dir.

HENRY S. BLACK

Data Recorder gen. mgr.

PAUL EWBANK

Union Steel exec. post

manager of purchasing and traffic was also appointed secretary.

Harry L. Benjamin was made assistant to the president, **United Aircraft Products Inc.**, Dayton, Ohio. He rejoins UAP after five years with Defense Electronics Div., General Electric Co., and is responsible for new product development. **George P. Lessis** was named general sales manager, and also rejoins UAP after association with Baldwin-Lima-Hamilton Corp. **Robert G. Hueffed** was made product manager for United Metallic O-Rings Section, a new post. **Michael J. Donegan** was made product manager for cold plates.

Robert E. Ditsler was made director of marketing, **International Steel Co.**, Evansville, Ind. He was sales manager of Futura Inc.

At Youngstown Sheet & Tube Co.'s **Indiana Harbor Works**, East Chicago, Ind., **Robert V. Cordingley** was promoted to general superintendent, Steel Plant, rolling and finishing. He is succeeded by **John C. Cannon** as assistant general superintendent, Strip, Sheet & Tin Div. **Howard C. Rodgers**, superintendent of No. 1 tin mill finishing, was made superintendent of No. 1 tin mill. **Norman W. Tucker**, superintendent of No. 1 tin mill cold reduction, succeeds Mr. Cannon as superintendent of No. 2 tin mill.

Earl V. Pierce, sales manager, Kenosha, Wis., Div., **Anaconda American Brass Co.**, was made vice president, Midwestern region, to succeed **Richard H. Barden**, retired. Mr. Pierce is succeeded by **James L. Marvin. Walter C. Malsch** was made assistant sales manager, Waterbury, Conn., Div.

Michael J. Marino was made marketing manager of the industrial distributor program of **International Resistance Co.**, Philadelphia.

Charles O. Breitsprecher was named assistant sales manager for industrial hydraulic sales by **Racine Hydraulics & Machinery Inc.**, Racine, Wis.

Philip A. Gaebe was named to the new post of product manager-refractories, **Kaiser Refractories & Chemicals Div.**, Oakland, Calif., Kaiser Aluminum & Chemicals Sales Inc.

HARRY L. BENJAMIN
United Aircraft Products post

ROBERT E. DITSLER
International Steel marketing

ROBERT V. CORDINGLEY
Indiana Harbor Works supt.

E. A. MARCH
Crucible technology dir.

E. B. MITCHELL
Sheffield Div. appointment

WILLIAM D. SPAULDING
Weirton operations v. p.

E. A. March was made director of technology, heading the Technology Dept. of **Crucible Steel Co. of America**, Pittsburgh. He was director of metallurgy and technical development.

E. B. Mitchell was appointed assistant to the vice president-general manager of **Sheffield Div.** at Houston, Armco Steel Corp. He replaces the late **J. George Miles.** Mr. Mitchell will manage division-wide industrial relations and employee communications. **A. E. Ansel** replaces Mr. Mitchell as supervisor of labor relations at the Kansas City Works.

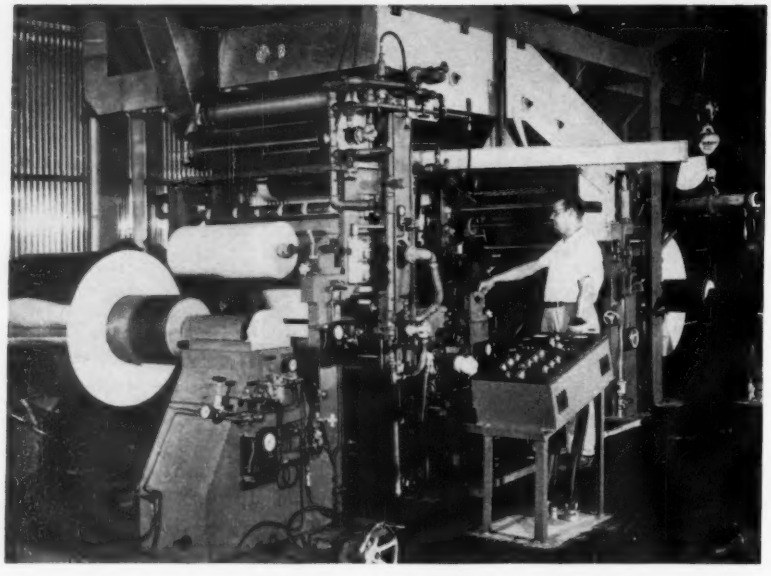
Frank C. Di Luzio, deputy manager of the Atomic Energy Commission's Albuquerque, N. Mex., operations, joined **Fairbanks, Morse & Co.** as general manager of its Albuquerque Electronics Research Div.

Donald R. Senecal was elected vice president-manufacturing, **Schemenauer Mfg. Co.**, Holland, Ohio.

William D. Spaulding was named vice president-operations at **Weirton Steel Co.**, Weirton, W. Va., division of National Steel Corp. He succeeds **Charles E. Carr**, retired. Mr. Spaulding was made vice president-operations of Great Lakes Steel Corp., National Steel's Detroit Div., in 1955. Two years later, he was promoted to National Steel's Engineering Dept., and in 1958, was advanced to its Research Dept. in charge of general research problems.

Frank K. Murdock was made Chicago area district sales manager for **Allegheny Ludlum Steel Corp.**, Pittsburgh. He succeeds W. G. **McFadden**, retired.

Gail B. Hamilton Jr. was made manager of a new process automation sales operation at **General Electric Co.'s** Industry Control Dept., Salem, Va. He directs application and marketing of electrical and electronic controls used in automation of industrial process lines.



Wax laminator starts operations at Davenport Works as . . .

Alcoa Expands Fabricating Units

ALUMINUM CO. of America, Pittsburgh, has expanded its facilities to meet the growing and complex needs of the missile, rocket, and electronic instrumentation industries. Alcoa is also completing a $1.5 million expansion at its Davenport (Iowa) Works to establish the company as a major source of unprinted aluminum foil laminations for packaging, labeling, building insulation, and other industries.

• **Special Products** — Rome Cable Div. has established electrical cable production facilities, geared to "markets of tomorrow," in a new plant at East Los Angeles, Calif., says A. D. R. Fraser, Rome Cable president. Equipment of the new unit (Special Products Facility) permits manufacture of a wide range of complex and highly specialized electrical cables and assemblies. Among its capabilities: Single cables measuring up to 4 in. in diameter; cables consisting of as many as 330 separate conductors; incorporation of special connecting devices, reliable under severe environmental conditions; and unusual configuration of cable, suitable for the rigid requirements of spacecraft and ground support equipment.

Robert D. Golly has been named general manager of the new facility.

• **Davenport Works** — New foil laminators and supporting equipment at Davenport enable Alcoa to produce unprinted foil in combinations with paper, wax, paperboard, and plastic materials for printers, package makers and users, and converters.

The new facilities are near the Davenport Works's large foil rolling operations. J. Robert Roney is Alcoa's sales manager for foil laminated products.

Realigns Sales Staff

Kaiser Aluminum & Chemical Corp., Oakland, Calif., is adopting a direct marketing approach to major aluminum consuming industries. The industrial sales management staff has been divided into these marketing departments: Building products manufacturers, industrial products customers, the can industry, and distributors. "By concentrating sales responsibilities by market categories—rather than by products such as sheets or plates which has been the case—increased attention can be given the needs and problems of major groups of customers," says J. W. Watson, vice president and general sales manager.

Installs Rolling Mills

Fairmont Aluminum Co., Fairmont, W. Va., is installing a single stand, 77 in., four high rolling mill and a two stand, 77 in., four high tandem mill as part of its $10 million expansion and modernization program. The rolling mills were built by Industrial Equipment Div., Baldwin-Lima-Hamilton Corp. and are designed to increase the variety and size of aluminum sheets and to speed output. Fairmont Aluminum is a subsidiary of Cerro Corp. (formerly Cerro de Pasco Corp.).

Hamilton Forms Division

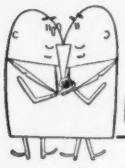
Hamilton Watch Co., Lancaster, Pa., has established a Precision Metals & Electronic Div. under the supervision of L. A. Hurwitz. R. M. Jackson is in charge of the electronics product group. New products of the division include pulse transformers, toroidal inductors, and special magnetic devices. The division also offers electronic development services with extremely close quality control. The firm produces ultrathin metal strip (from 0.050 to 0.00001 in.).

Pre Finish Metals Expands

Pre Finish Metals Inc., Oak Grove Village (Chicago), Ill., is expanding its production facilities through purchase of a $300,000 continuous painting and slitting line from Yoder Co., Cleveland. The new equipment will provide the Chicago firm with the capacity to coat and slit 48 in. wide coils in gages from 0.008 to 0.065 in. at speeds up to 150 fpm. Present equipment can coat and slit 18 in. wide coils and can coat 72 in. wide sheets.

Air-Maze Made Division

Rockwell-Standard Corp., Coraopolis, Pa., is now operating its wholly owned subsidiary, Air-Maze Corp., Cleveland, as its Air-Maze Div. The division is under the direction of W. B. Watterson, general manager.



CONSOLIDATIONS

Koppers Co. Inc., Pittsburgh, acquired controlling interest in **Thomas Flexible Coupling Co.**, Warren, Pa., and will operate the property as a subsidiary.

McKay Co., Pittsburgh, acquired **Automatic Welding Co.**, Waukesha, Wis., manufacturer of equipment used for all types of automatic welding. McKay makes welding electrodes, welding wires, chain, and chain products.

Arthur G. McKee & Co., Cleveland, acquired the **Western Machinery Co.**, San Francisco.

American Brake Shoe Co., New York, purchased **Dynisco Inc.**, Cambridge, Mass., manufacturer of electromechanical transducers and ultrasensitive measuring instruments. Dynisco will be operated as a division.

S.M.S. Corp., Birmingham, Mich., merged with its parent firm, **P. R. Mallory & Co. Inc.**, Indianapolis. The property is designated as the Birmingham plant of Mallory Metallurgical Co., a division of P. R. Mallory & Co. Inc.

Chemetron Corp., Chicago, acquired **Northwest Chemical Co.**, Detroit, manufacturer of chemicals widely used in the metalworking industry. Northwest Chemical's plant and offices at 9310 Roselawn, Detroit, Mich., will continue under the direction of H. J. McCracken, B. F. Lewis, and Helen M. Morell, founders of the firm. The property will be a part of Chemetron's Chemical Products Div.

Magnaflux Corp., Chicago, acquired **Metal Control Laboratories**, Los Angeles, engaged chiefly in metallurgical, chemical, and mechanical testing. Magnaflux is a subsidiary of General Mills Inc., Minneapolis.

Columbia - Southern Chemical Corp. is now being operated as the Chemical Div. of **Pittsburgh Plate Glass Co.**, Pittsburgh. It formerly was operated as a wholly owned subsidiary. James A. Neubauer is vice president and general manager, Chemical Div.; Chris F. Bingham, vice president-chemical sales.

Bell & Howell Co., Chicago, purchased **Russell Ernest Baum Inc.**, Philadelphia, maker of folding machines, and its subsidiary, **Liberty Folder Co.**, Sidney, Ohio.

NEW ADDRESSES

Colorado Fuel & Iron Corp., Denver, moved its Boston district office to the Riverview Industrial Center, Needham, Mass. The facility consists of 20,000 sq ft of warehouse space and 3200 sq ft of office space. L. A. Watts is general manager of sales, Eastern Div.

Star Wire Screen & Iron Works Inc., subsidiary of Ludlow-Saylor Wire Cloth Co., moved to Sunset Avenue and Valley Boulevard, City of Industry, Calif.

Temescal Metallurgical Corp. moved its offices and plant to 2850 Seventh St., Berkeley, Calif.

Convair Div., General Dynamics Corp., San Diego 12, Calif., is moving its Dynapak facility from Pomona, Calif., to 2930 W. Harbor Drive, San Diego, Calif. The facility makes high-energy-rate metal forming machines and a line of mechanical test equipment.

International Ultrasonics Inc. moved its offices and production facilities to 331 Centennial Ave., Cranford, N. J.

Stephenson Industries Inc. moved all manufacturing operations to a 50,000 sq ft building at 1695 E. Mansfield Rd., Bucyrus, Ohio. The company makes transmission handling and other automotive service tools and equipment, U-joint flanges, and other OEM parts. A sales office will be maintained in Detroit and is temporarily in the former plant at 548 E. Fort St., Detroit 26, Mich.

Zero-Max Co., manufacturer of variable speed drives, moved to 2845 Harriet Ave. S., Minneapolis 8, Minn.

ASSOCIATIONS

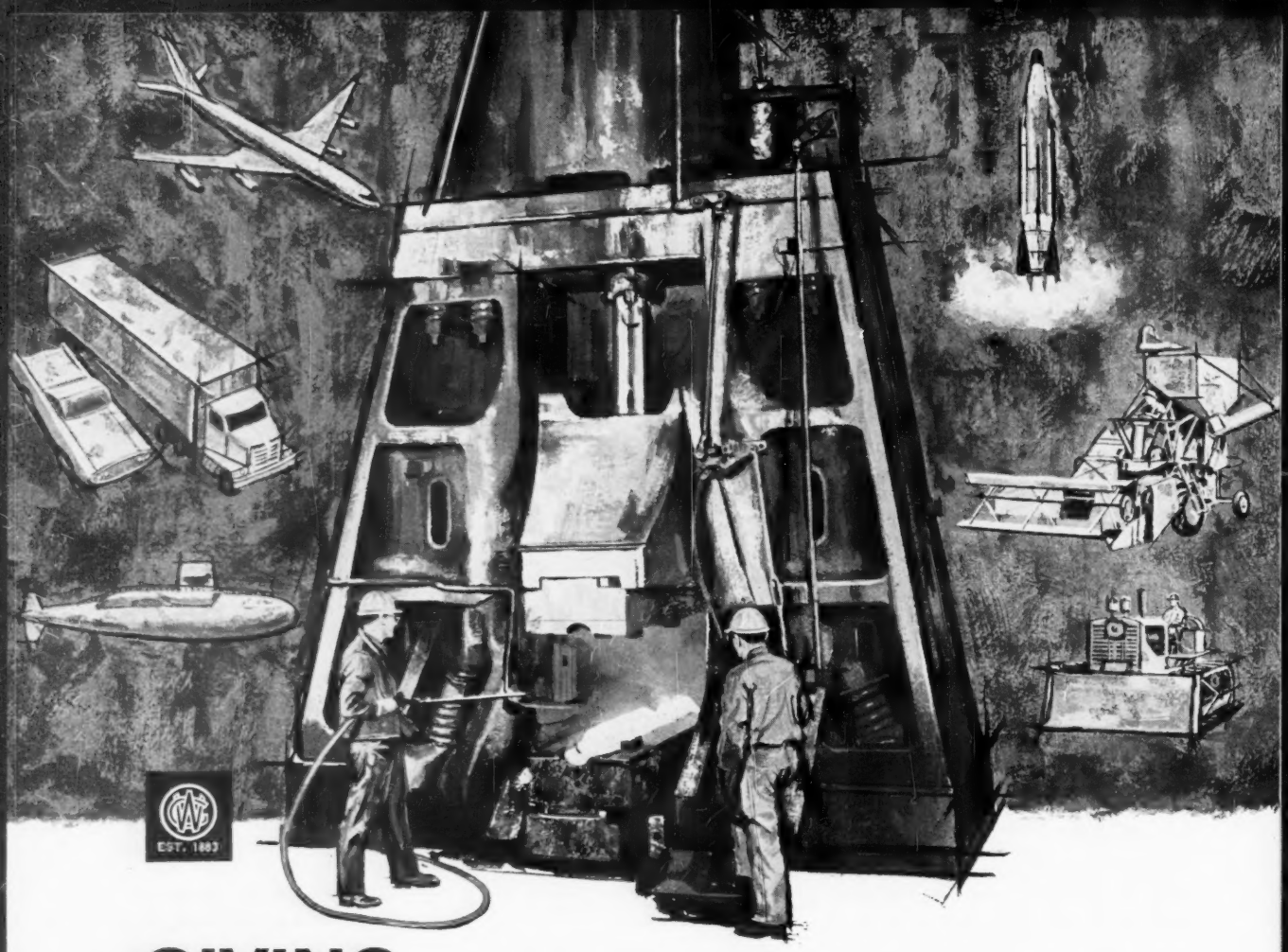
Institute of Scrap Iron & Steel Inc., Washington, elected these officers: President, M. K. Mahler, Morrow Steel Co., Detroit; first vice president, E. J. Moskowitz, Schiavone-Bonomo Corp., Jersey City, N. J.; second vice president, Harry Marley, Abe Cooper-Syracuse Inc., Syracuse, N. Y.; treasurer, I. D. Shapiro, United Iron & Metal Co. Inc., Baltimore; and secretary, L. I. Abrams, Atlas Steel & Supply Co., Cleveland. S. G. Keywell, Samuel G. Keywell Co., Detroit, continues as treasurer emeritus; W. S. Story, assistant executive vice president; and W. N. Brinker, director of public relations.

Pressed Metal Institute, Cleveland, appointed J. D. Keith as managing director. Marion Sherwood, Grand Haven Stampings Inc., Grand Haven, Mich., is president.

Society of Automotive Engineers Inc., New York, elected these officers: President, A. A. Kutcher, Ford Motor Co., Dearborn, Mich.; and treasurer, G. A. Delaney, retired chief engineer, Pontiac Motor Div., General Motors Corp., Detroit.

Package Conveyor Institute elected these officers: President, George Greenberger, Sage Equipment Co. Inc., Buffalo; first vice president, Carl Sheets, Conveyor Div., American MonoRail Co., Tipp City, Ohio; second vice president, Vernon Story, Lamson Conveyor, Syracuse, N. Y.; secretary, J. R. Keen, E. W. Buschman Co., Cincinnati; and treasurer, L. G. Backart, Rapistan-Keystone, Detroit.

American Powder Metallurgy Institute, New York, has established a West Coast Section with headquarters in Los Angeles. Anyone interested in belonging to the institute and participating in the West Coast Section should contact either the chairman, R. H. Khuen, Asco Sintering Corp., 7799 Telegraph Rd., Los Angeles 22, Calif., or the institute's executive secretary, K. H. Roll, 60 E. 42nd St., New York 17, N. Y.



GIVING METAL NEW MUSCLE BY FORGING

. . . a specialty Wyman-Gordon knows best and is best equipped to perform for you

Specify "punishing service" in any environment—land, sea, air or space—and there is no substitute for a forging's endurance. Likewise, specify reliability in your supplier and there is no substitute for experience.

Here Wyman-Gordon has the outstanding record. Our background in hot working all forgeable materials covers more than three-quarters of a century. From it have come most of today's major advances—in forging techniques, metallurgical controls and development of facilities for extending size and complexity of forged parts. This accumulated know-how has done much to make Wyman-Gordon "forging headquarters" for an impressive list of industrial leaders.

Most likely our experience in saving weight, adding strength and reducing machining cost on countless other parts—can do as much for yours. To get expert appraisal, ask to have a forging engineer call while designs are still on the board.

WYMAN-GORDON

FORGINGS

of Aluminum Magnesium Steel Titanium . . . and Beryllium Molybdenum Columbium and other uncommon materials

HARVEY ILLINOIS · WORCESTER MASSACHUSETTS · DETROIT MICHIGAN

GRAFTON MASSACHUSETTS · LOS ANGELES CALIFORNIA · PALO ALTO CALIFORNIA · FORT WORTH TEXAS

Developments and trends spotlighted at SAE meeting . . .

MAGNESIUM TRANSMISSIONS—Look for magnesium transmissions in autos within the next three years. At the Society of Automotive Engineers international congress last week in Cobo Hall, Detroit, one producer of the metal predicted average use per car would exceed 10 lb per car by 1965.

GALVANIZED GAINS—Ford Motor Co.'s program to increase use of galvanized sheets in making car bodies is part of a long range program aimed at upping warranties to two years, state SAE sources. One bit of evidence cited: The Thunderbird which employs more than 200 lb of such components in underbody construction. One problem remains: Bleedthrough on differentially coated sheets.

RADIATOR OF TOMORROW— Future autos may have plastic reservoirs that employ adhesives to join them to metal tubes, predicts Minnesota Mining & Mfg. Co., Minneapolis. Some present adhesives hold 10,000 psi, resist water, salt, solvents, and will adhere to surfaces covered with a thin film of oil. Adhesives are also being proposed to join trim, hinges, and even large structural members.

ALUMINUM RADIATORS GAIN—Light metal radiators are now standard on Chevrolet Corvettes (last year only cars equipped for fuel injection had them). Aluminum Co. of America, Pittsburgh, reports it supplies No. 12 brazing sheets and 3003 stock for the fins. Dip brazing is employed for joining; fittings are added by tungsten arc (Tig) welding. Two standby alloys (6563 and 10-648 AA magnesium silicide) are well suited for such applications, says Alcoa.

ELECTRONIC IGNITION—Contact points and condensers are eliminated in the latest ignition system for autos, says Delco-Remy Div., General Motors Corp., Detroit. Depending on the results of studies, it may be extended to stationary engines, trucks, and tractors, says Herman L. Hartzell, chief engineer of the division. Units are pulse controlled; they won't pit, wear, oxidize, making replacement unnecessary. One test unit has run 5000 hours.

MAGNETOHYDRODYNAMIC AUTO—Scientists at Plasmadyne Corp., Santa Ana, Calif., are taking a look at plasma powered autos. They visualize a plasma generator taking the place of the conventional gasoline engine and its ignition system, and car operation without clutch, transmission, differential, or brakes.

ROUTING RUST—Within ten years, auto bodies that won't rust will be in production, say representatives of Budd Co., Philadelphia, and U. S. Steel Corp., Pittsburgh. They'll be adhesive bonded. Aid of designers will be enlisted in building in corrosion resistance.

HONEYCOMB FOR HAULERS—A lightweight, amphibious truck (capacity: 2½ tons) for the Army weighs only 1400 lb (without drive train). It has honeycomb panels which offer these advantages, say the Army and Whirlpool Corp., St. Joseph, Mich.: Improved corrosion resistance (because such panels bypass the problem of dissimilar metal fasteners); better insulation; high strength-to-weight ratio; good rigidity; excellent fatigue strength. They also cost less to fabricate than conventional types, says Whirlpool.

ARMY PINPOINTS ENGINE TREND—Coming power source for the '60s is the gas turbine, thinks Lt. Gen. A. G. Trudeau, R&D chief for the U. S. Army. What about the '70s? Fuel cells will take precedence for advanced vehicles. Principal advantages sought: Lightness, easy maintenance.

UBIQUITOUS PLASTICS— Manufacturers of chemicals and plastics are proposing: A drop of plastic for tightening fasteners, holding bearings in place, sealing porous castings, and stopping leaks; plastic components such as seat assemblies, ceiling panels, and even exterior panels.

"We consider our cost reduction program a major competitive weapon. Its ultimate test is whether it permits us to grow in a price conscious, subcontract industry. In the last five years, we've boosted our share of the market by at least 50 per cent," says Arthur H. Schweitzer, manager, Tapco Jet Div., Thompson Ramo Wooldridge Inc., Cleveland

How Constant Cost Reduction Works at Tapco Jet

OVER THE LAST five years, a team of managers at Tapco Jet Div., Thompson Ramo Wooldridge Inc., Cleveland, has trimmed manufacturing costs an average of 1 per cent per month. And the job has been done without the advantage of product redesign, one of the most potent cost cutting weapons.

Division Manager Arthur H. Schweitzer explains: "Our total cost improvement effort must come in the areas that cover manufacturing, tooling, and production administration. Even the savings we can achieve in purchasing are limited, since the materials we buy are dictated by customer specifications. Yet, we have achieved savings there by doing an increasingly better job of buying in economical quantities and by just plain shopping.

"In our business of supplying components like jet blades for other manufacturers' products, we are responsible for making the parts according to the blueprints submitted. Only rarely do we have the opportunity to change a design or a material specification to make the part easier to produce."

• There's no secret to cost reduction at Tapco Jet. It's the result of thorough planning, plus a continual program of followthrough.

Beginning with an accurate report of present costs:

- Industrial engineers prepare a year's master plan for cost improvement.
- Committees are set up to study each project, set a target for themselves, then report weekly on their progress.
- Actual costs are continually measured and compared with established targets.

The first step on a new contract is to set up manufacturing operations. A team of industrial and methods engineers pores over the prints, coming up with manufacturing steps and standards (time and cost) for each stage. "This is our first critical step," says W. H. Goldbach, chief industrial engineer. "All our costs for an entire contract are budgeted on the basis of this original determination of standards. We have to be right."

Many of the standards can be set on the basis of experience with similar jobs. In other cases, Tapco Jet industrial engineers will time the job in the shop to furnish them with realistic standards.

• "The place to start on any cost reduction program is with accurate data on present costs."

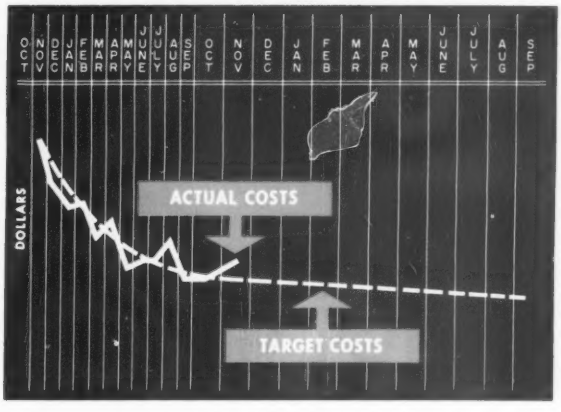
That's not as easy as it sounds, continues Mr. Schweitzer. In many cases, he feels, manufac-

A ten month cost reduction effort on these 22 parts . . .

Saved $1.46 million in one year

Part	Unit Costs		Savings per unit
	Jan.	Oct.	
1.	$17.07	$9.34	$7.73
2.	14.33	9.60	4.73
3.	14.21	7.63	6.58
4.	7.63	4.22	3.41
5.	10.55	9.78	0.77
6.	10.61	7.86	2.75
7.	9.82	6.80	3.02
8.	9.66	6.49	3.17
9.	67.06	46.37	20.69
10.	61.90	45.10	16.80
11.	53.97	33.87	20.10
12.	51.54	27.02	24.52
13.	13.60	10.66	2.94
14.	9.34	7.62	1.72
15.	9.03	6.08	2.95
16.	4.68	4.48	0.20
17.	15.68	14.96	0.72
18.	13.99	10.93	3.06
19.	12.85	11.73	1.12
20.	11.44	10.60	0.84
21.	7.68	7.04	0.64
22.	5.92	6.34	−0.42

W. H. Goldbach (left), head of industrial engineering, Mr. Schweitzer (center) and W. S. Johnston, manager of operations, continually compare measured costs with those the committees set as targets. Charts, like the one below, show whether their efforts are paying off



turers use guesses, estimates, or rules of thumb for their costs, and they may be deceiving themselves.

All direct costs are closely computed or measured at Tapco Jet. Items such as direct labor, materials, and tooling are translated in terms of unit costs. The accounting department also allocates a portion of fixed overhead costs (like heat, rent, and light) to the unit cost figure.

Those costs are then worked into the annual budget on Oct. 1, the beginning of Tapco Jet's fiscal year. The budget is a year's projection of costs as they are known in October. It is a yardstick against which performance will be measured.

• Cost reduction targets are set on each job. And committees build the program.

A full year's master plan is readied for publication about the middle of January each year. The master plan, prepared by industrial engineers, reviews the cost reduction performance from the preceding year; the objectives for the coming year are spelled out; and committee assignments are made.

The cost program is headed up by a general committee, consisting of Chairman W. S. Johnston, manager of operations, Mr. Goldbach, the factory managers of both the airfoils and components works, the manager of accounting, quality control manager, and purchasing manager. It meets once a month. (During the planning stages each year, it meets daily.) Its purpose, says Mr. Johnston, is to review the previous month's activities and to get personal progress reports at each meeting from two analysis committees. The committee also directs the over-all cost reduction effort and establishes and schedules special projects.

Working under the general cost reduction committee are the analysis committees (22 of them this year). These committees are made up of department supervisors or others that have direct cost responsibility either in the plant or in the office. Analysis committees may be assigned products like a rotor or stator assembly, or they may get broader special projects, such as inspection procedures.

Accounting supplies the cost history with a detailed breakdown. The committee (and subcommittee groups) discusses and analyzes every operation for possible elimination or combination with others. They assign themselves a target cost based on their preliminary study and a target date on which they intend to reach that cost.

Industrial engineers and cost ac-

Four Elements of Cost Reduction

A preliminary outline for the cost reduction program at Tapco Jet lists these as the critical factors:

- **Be fully and accurately aware of the present cost situation.**

  The accounting department must compile background data on all operations, with particular emphasis and breakdown on high cost products and areas like indirect labor, supplies, and tooling. Industrial engineering uses this as a guide to find out where cost reduction is urgently needed.

- **Approximate plant potential and establish targets on products and areas selected.**

  Targets for cost reduction become a yardstick against which actual cost performance can be compared, and they can help management plan its pricing in advance by providing an estimated cost level.

- **Arouse the necessary interest in all employees to accomplish goals.**

  One of the keys to cost reduction, says Manager A. H. Schweitzer, is to get the men in the plant concerned about it so they'll be interested in efficiency.

- **Devise a reporting and recording system so accomplishments can be compared with past performance and established goals.**

  W. S. Johnston, manager of operations, says this point has at least two payoffs. It proves to participants that their efforts will show up in the company's financial picture. It also tells company management whether emphasis is properly placed.

countants continually measure and report actual costs and compare them with goals. (See graph, Page 53.)

• With the team effort, cost improvement ideas run the gamut—from eliminating an operation to salvaging some tooling.

In the 1960 master plan, management reported on a stator vane for a jet engine: "Savings of $90,475 were reported for ten months of (cost improvement) activity ended in October, 1959."

The committee reported that in the same period it had considered 29 separate cost cutting steps. Five were rejected. Sixteen projects were accepted, put into force, and contributed to the saving.

The ideas included: Elimination of nine operations by combining them into others; addition of hydraulic clamping to a broaching fixture; conversion of some trim die material; getting a better material price on two parts; modification of a dieset to get better stock distribution.

• Many of the manufacturing economies come about through a change in methods or materials. Here are some examples.

• A jet engine turbine case forging was purchased as an extruded die forging. It weighed 113 lb and required a lot of finishing. Purchasing men shopped for a better idea; they found a vender who would make the part as a rolled ring forging that weighed 40 lb less than its predecessor and required less machining. Costs were reduced 21 per cent.

• An abrasive cutoff machine was used to cut titanium bar stock to length. Each cut resulted in a $\frac{1}{8}$ in. stock loss. A gas fired unit didn't hold the temperature well enough for hot shearing. A new shear with automatic temperature regulated induction heating was purchased. Material savings: $35,000 the first year.

• Used forging dies were sold for scrap. Some of them were sound. Now the good dies are sorted out and saved. When new dies are needed, the old blocks often can be modified to fill the bill. Material savings: $10,000 a year.

• Looking for a way to lengthen the life of abrasive belts, an engineer came up with a simple but effective technique: Dip them in oil. The saving comes to $21,000 a year.

• About 70 per cent of the grease used on extrusion die cavities was lost in the press pit which had to be cleaned weekly. Automatic spraying of the grease into the cavity cut the waste. Saved: $10,000 a year.

• In making jet engine compressor blades, production men need a defectfree extrusion prior to final forging. Hand polishing and centerless grinding were used to polish the part. A new automatic machine now does the job, saving time and boosting quality. Saved: $10,000 a year.

• The formal approach, with its target, investigation, and reporting procedure, gets a big share of the credit for cost achievement at Tapco Jet.

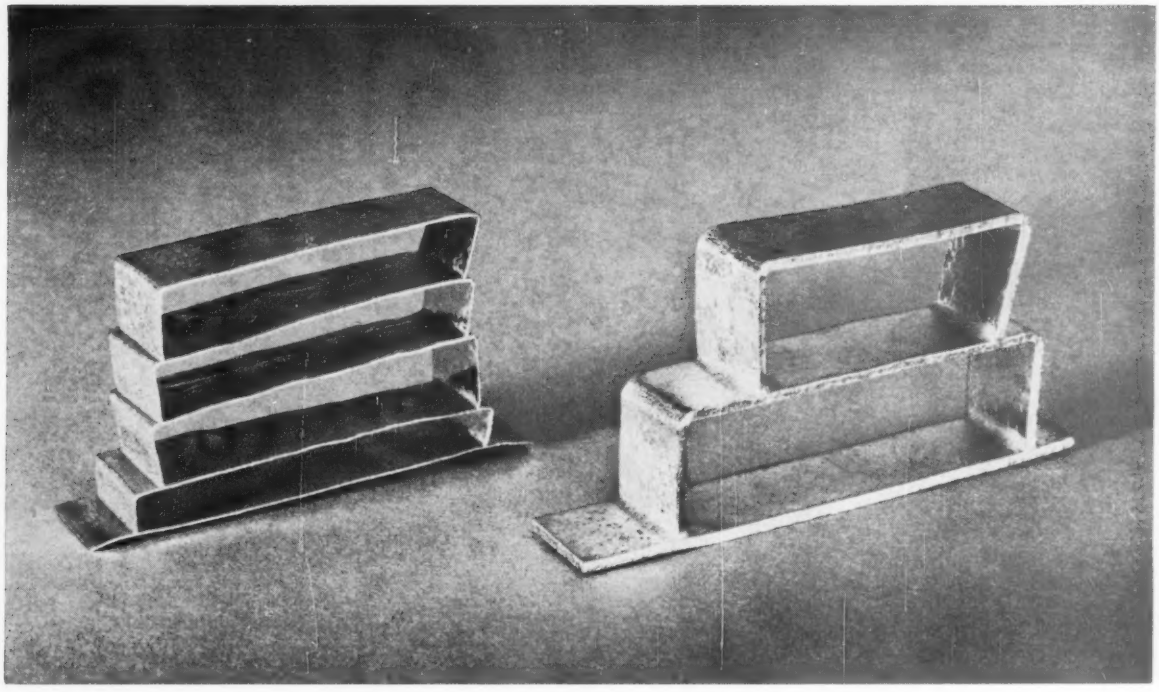
Mr. Johnston observes: "One of the most difficult parts of any continuing program is to maintain the absolutely essential interest and enthusiasm of the managers, supervisors, and others who can make it work.

"Our formal system of establishing targets, then accurately measuring and reporting progress (or the lack of it) keeps this concern alive, we believe, and it also tells management whether our direction is right. When we succeed, we all know about it and can see the results of our success. Equally important, our failures show too."

• The final measure of the program's success is the company's ability to compete.

Mr. Schweitzer says: "The ultimate result of our efforts shows in our company's position in our highly competitive market. As closely as we can tell, we're getting a 50 per cent larger share of our industry's business than we did five years ago. Cost improvement gets credit for much of that success. With lower costs, our bids are increasingly competitive. Further, when bids come up for renewal, and we've had experience on the first contract, our costs put us in the driver's seat."

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



Showing how new coating helps make butt joints, developer claims . . .

Diffusion Method Bonds Copper Perfectly

BONDS STRONGER than copper-base metal are easier to attain with a new diffusion bonding technique just developed, claims Chase Brass & Copper Co., a subsidiary of Kennecott Copper Corp., Waterbury, Conn.

It will cut joining costs and improve production methods and finished products, says Glenn P. Bakken, president of Chase.

Copper-to-copper and copper-to-alloy bonds made by the method retain virtually all the electrical and thermal conductivity of pure copper. Among others, electrical hardware applications of Phosnic bronze (which can be heat treated to a high strength level after diffusion bonding) are expected to increase as a result of the Chase development.

• Three methods are employed. The technique requires a coating applied before or during assembly.

Coating the copper before heating permits making of joints without detectable interfaces, Chase says. The coating simply diffuses into the parts. Application of the coating can be made before final rolling or fabrication.

Another method employs application of the coating to only one of two components to be joined.

A third way: A coated insert of thin strip puts the coating where it's needed.

After coating, strip may be annealed in a nonoxidizing atmosphere at moderate temperatures and fabricated by standard techniques, such as blanking, deep drawing, bending, or stamping. Coatings require only reasonable care, says Chase.

Bonding takes place at 1700 to 1800° F in a hydrogen or inert gas atmosphere in 5 to 15 minutes. The carrier volatilizes during the heating and dissipates in the furnace atmosphere. Reasonably good contact of mating surfaces is needed to attain an acceptable joint.

• The diffusion bonding process has some limitations.

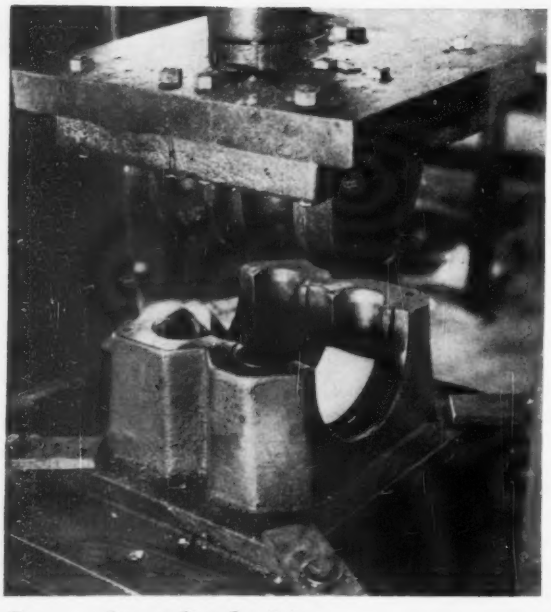
Those contemplating adoption of the process must consider that base metal is fully annealed. Sometimes, mechanical working can be done after joining (coining or internal expansion) to increase hardness and tensile strength.

True diffusion bonds have not yet been achieved with brass containing more than 5 per cent zinc. Brazed joints are possible in brasses with 30 per cent zinc. Unlike diffusion bonds, such joints have a phase separation line as conventional brazed joints.

Chase has applied for a patent on the process. It expects to market precoated copper strip and the bonding mixture in the near future.

Fittings Are Hot Formed From Seamless Tubing

Completed bend leaves mandrel

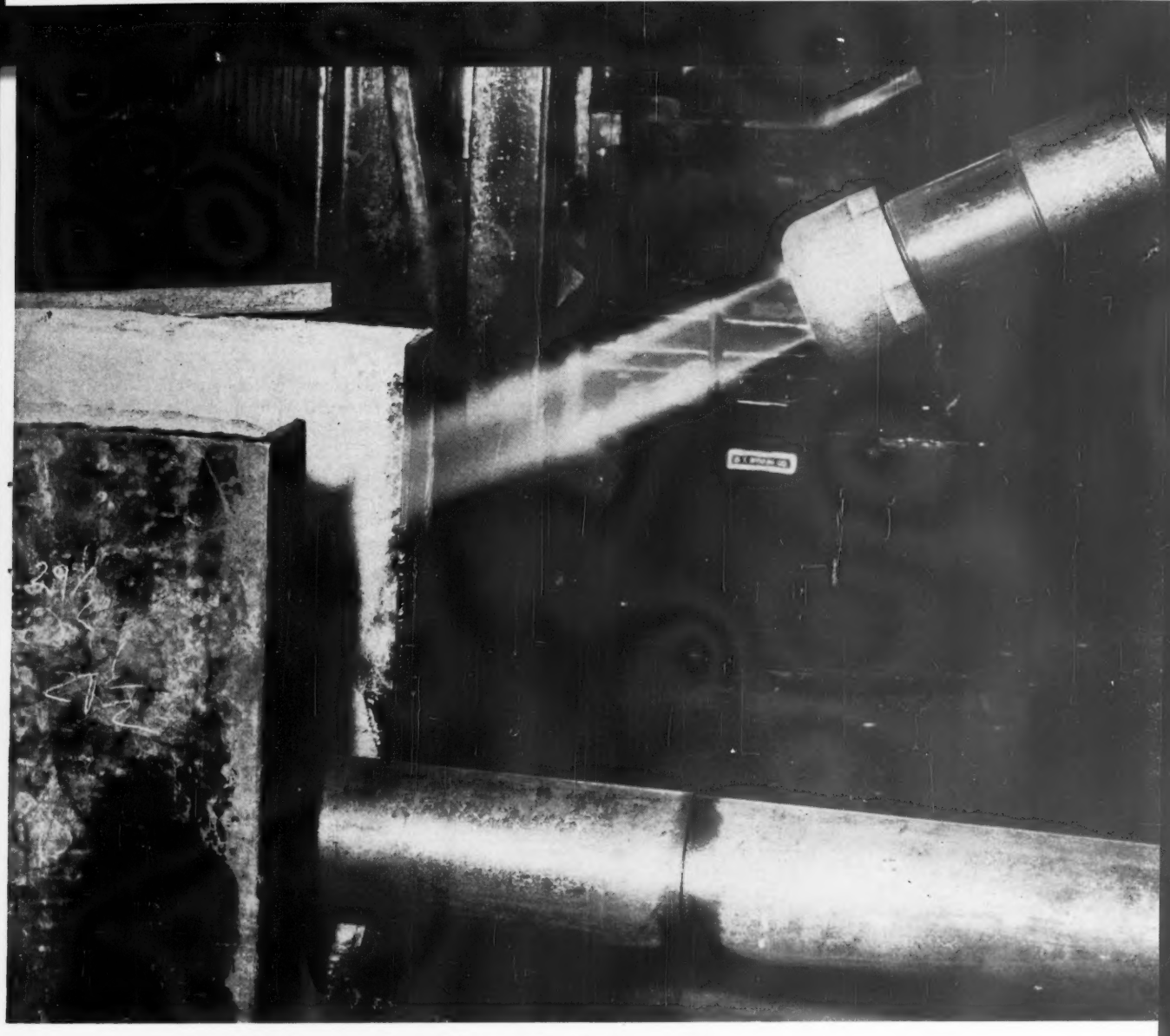


Press does final sizing

THE deceptively simple equipment shown above is the business end of a machine that forms welding fittings. Cut lengths of seamless tubing are formed into bends ranging from 45 to 180 degrees, with close control of size and uniform wall thickness.

In setting up the plant, the company, Flo-Bend Inc., Sand Springs, Okla., knew it would be locking horns with domestic producers and that imports from Germany, Italy, and England were entering the market.

Since the fittings are welded into place, in permanent type installations, accuracy, reliability, and uniformity in quality and wall thickness were essential.



. . . as other blanks are forced into the furnace area

• Operations were started with a purchased plant.

Equipment for the process was not available in the U. S., so the company purchased an entire plant in Hamburg, Germany.

The machines were put in operation at the Sand Springs plant about three years ago.

German designs and methods of operation could not be employed effectively, says James A. Close, vice president of the company, because they were slow and required excessive labor, pushing costs out of line. So much of the equipment was modified to produce 45, 90, and 180 degree bends. The oil and gas industry is the chief market.

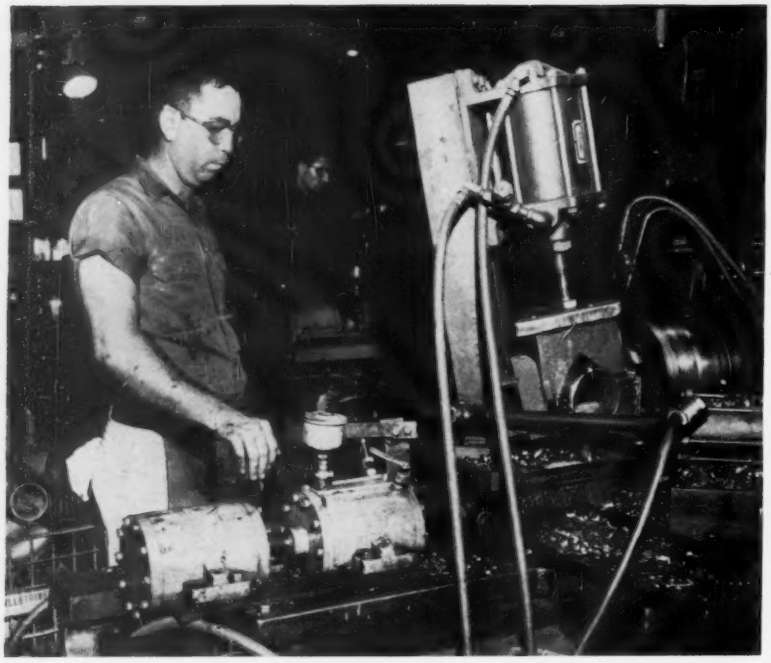
• Production starts with seamless tubing.

Flo-Bend buys mill lots of steel, which are rolled to the special sizes and wall thicknesses. The tubing is segregated by lots in a storage area separate from the plant and identified by heat. The identification is carried through the manufacturing steps so that finished bends can be traced to each shipment of steel.

A hoist deposits the tubing on a roller conveyor feeding a Do-All cutoff machine. Length of the cut is preset for each type bend, and the machine feeds automatically. Following cutoff, any burrs are removed; the identification is stamped on the section; and the cut tubing is cleaned to remove any dirt or grease which might be burned in during the following steps.

• Cut sections are loaded on the forming mandrel.

The operator of the bending machine charges it intermittently. The blanks are placed on the cold end of the forming mandrel until the machine is loaded to capacity. The drive block is then positioned. Its pressure is transmitted by the stack of blanks as the block moves forward. The drive block does not reach the heated portion of the machine; at the end of its stroke, it returns to the starting position, and more blanks are loaded by the



Lathe bevels and faces ends

operator — from storage baskets which hold the cleaned tubing sections.

The expanded portion of the mandrel has a carefully determined shape. Before the first push, it is preheated by a gas flame. During the forming of the bends, the flame is positioned to strike the inside of the bend. The bent area is enclosed in a refractory box which functions as a furnace to heat the balance of the tubing.

• As the blanks move over the mandrel, they are expanded and take the final curved shape.

Flow of the metal is controlled to maintain uniform wall thickness. Most of the metal movement is from the inside of the arc; there is little change on the outer radius.

As the drive block moves forward, each blank is progressively shaped. Length of the blank determines the type of bend produced, short sections making the 45 degree elbows and long ones the 180 degree return bends.

As each bend falls free of the mandrel, the operator removes it and transfers it to a sizing press where minor dimensional variations are corrected. After sizing, the bends are air cooled before the final machining.

• The bends are machined to align the faces and to produce the bevel for welding.

Special purpose, heavy duty lathes, with tooling designed by Flo-Bend, are set up for the machining steps. Clamping fixtures require only that the operator load and unload the machines. Hydraulic cylinders serve several purposes. They clamp the bend in place and also turn the fixture through the proper angle on the completion of the first cut, presenting the remaining face to the tools.

• Inspection and painting complete the steps.

After removal from the lathes, the bends are inspected for accuracy and appearance. Rough spots and small surface imperfections are cleaned up, and scale is removed by an abrasive blast.

Finally, the parts are painted for protection in shipping and storage. A conveyor line carries them through a dip tank and drying area; by the time they return to the operator, they are dry and ready for shipment. The cleaning and hot water rinsing which precede the painting step permit some retention of heat, which aids in the drying of the paint.

• Present sizes are limited to 6 in. diameters, but larger ones will be produced with equipment soon to be installed. With the new units, up to 12 in. diameters will be made available.

Also in the works for future production are tees, flanges, and other types of fittings.

The company says different manufacturing methods will be needed since tees cannot be formed by the same methods as those used for elbows, but the principle of moving metal rather then removing it will be followed.

Aluminum Silicon Alloys Have 50,000 psi Tensile

"Unprecedented mechanical properties" are claimed for aluminum, 21 per cent silicon alloys developed by Ford Scientific Laboratory, Ford Motor Co., Detroit.

Sand cast, chill cast, and permanent mold specimens have been studied. Results suggest ultimate use of the alloy for liner free, engine block castings, says Y. P. Telang of the laboratory.

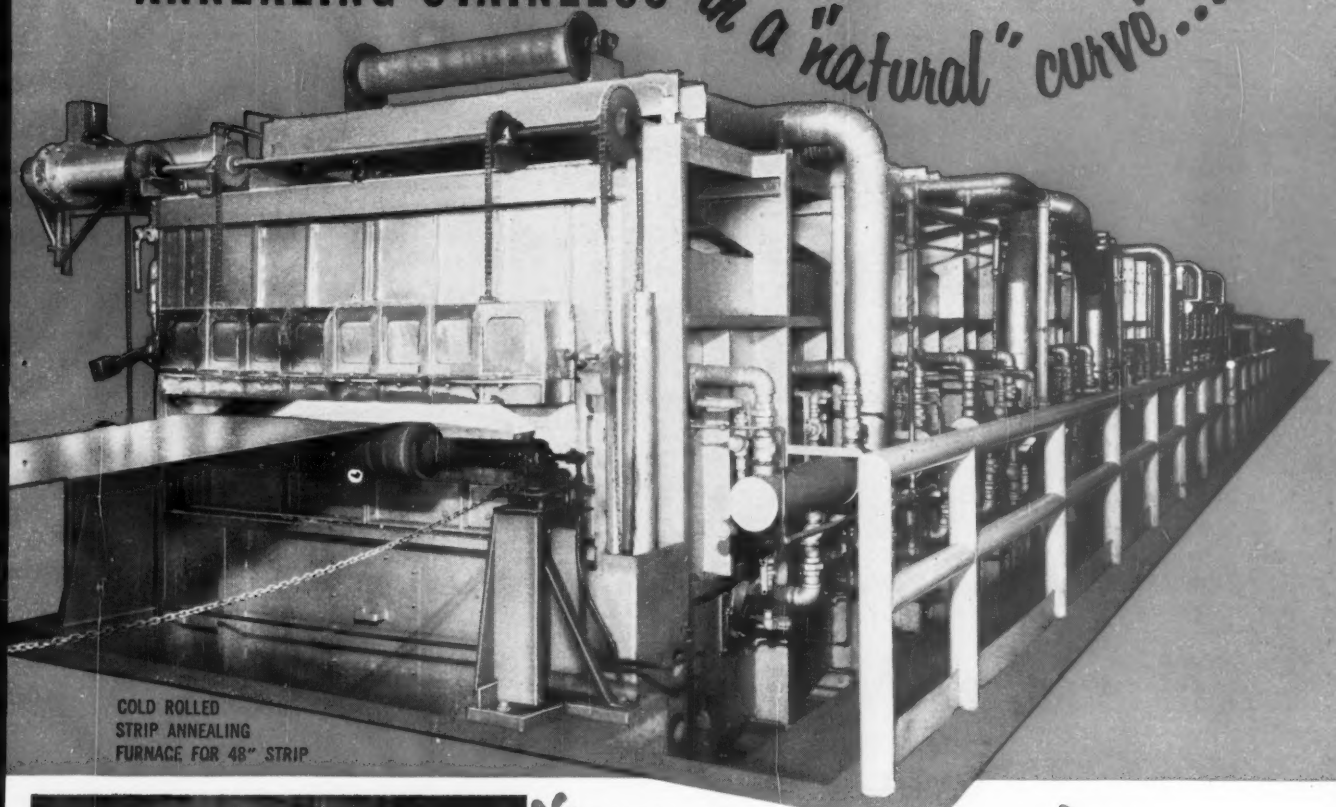
In addition to high strength (50,000 psi tensile), the alloys have excellent hardness, impact and antifriction properties, low density, and lowered thermal expansion coefficients.

"In fact," says Mr. Telang, "these properties are higher than those of commercial automotive casting or heavy duty piston alloys currently in use."

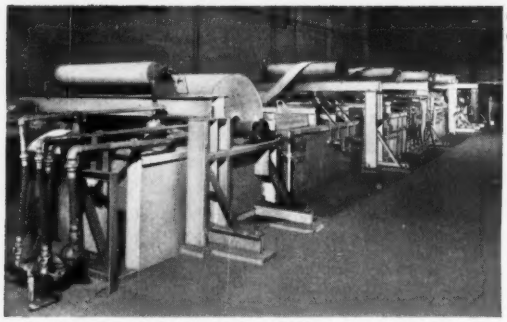
He says the alloys possess the advantage of little or no loss in refinement during remelting, superheating, or holding at elevated temperatures.

Alloys of similar composition have been used for pistons in Europe, but their poor foundry characteristics, excessive variation in properties, and poor machinability have caused them to be generally neglected in this country, says Mr. Telang.

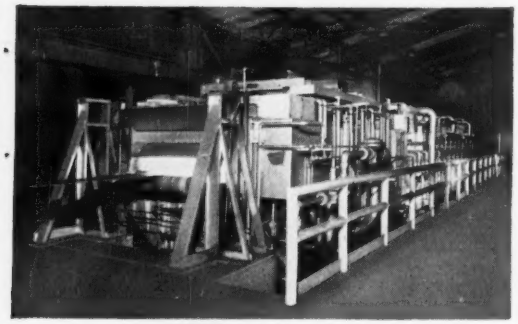
ANNEALING STAINLESS *in a "natural" curve...*



COLD ROLLED
STRIP ANNEALING
FURNACE FOR 48" STRIP



ABOVE: SALT DESCALING BATH. BELOW: HOT ROLLED STRIP LINE.



*A Catenary curve, that is...

...the natural path assumed by the strip as it passes through the continuous Annealing Furnace. Complete exposure of the strip surface to heat and furnace atmosphere and the uniform stress throughout the strip assure maximum product uniformity. Support of the strip by special soft compressed asbestos disc rolls located outside the ends of the furnace assures an unmarked surface.

STAINLESS STEEL HEAT TREATING SPECIALISTS

The support of the strip on special rolls and the proper application of thermal conditions are but part of the engineering technique and heat treating experience that enter into the design of Drever Stainless Strip Annealing and Descaling Lines. Keeping pace with the ever growing demand for heat treatment of stainless steel in all its forms has been a particular project at Drever. This specialization is reflected in the number of successful installations, in many sizes, now in operation.

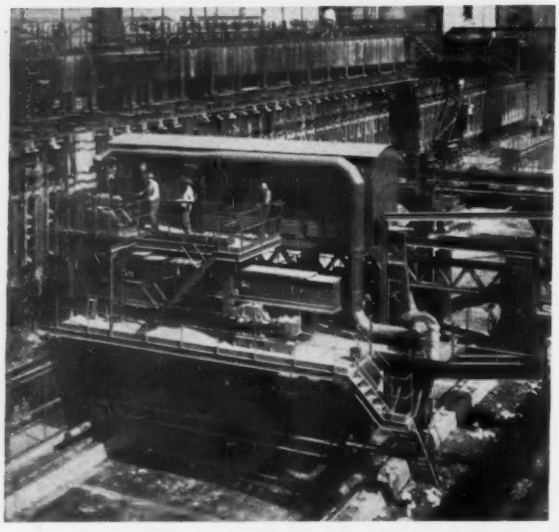
DREVER ENGINEERING FOR YOU

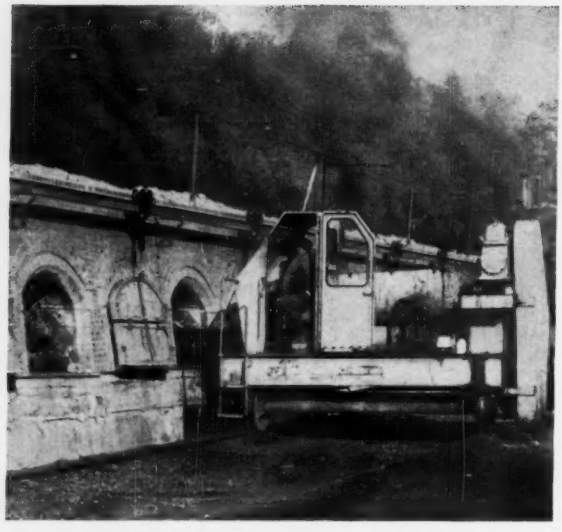
The widening industrial and commercial use of stainless steel and the higher quality standards point up the need for producers to study the latest methods of heat treatment. Consult with our engineers regarding your requirements—or ask for Bulletin B-81. Drever Company, Bethayres, Pa. Phone: WIlson 7-3400.

DREVER INDUSTRIAL FURNACES

ENGINEERED TO YOUR PARTICULAR REQUIREMENTS

ENGINEERING AND MANUFACTURING FACILITIES AROUND THE WORLD THROUGH ASSOCIATES IN FRANCE, GREAT BRITAIN, GERMANY, ITALY, JAPAN AND INDIA





Byproduct ovens and mechanized, nonrecovery units compete as . . .

Cokemaking Methods Are Reappraised

NONRECOVERY coke ovens are making a comeback in some areas because of competition from petrochemicals for coal chemical markets. But many steelmakers still prefer byproduct ovens because they anticipate more favorable chemical markets or because equipment required to collect the chemicals is useful for air pollution control.

Some companies are using semi-byproduct ovens, which permit collection and cleaning of exhaust gases and some chemical recovery.

• Several benefits are offered by the byproduct type ovens to partially offset high capital and operating costs.

The capital cost of byproduct ovens is far more than that for semi-byproduct ovens (which recover light oil and tar), mechanized nonrecovery ovens, or beehives. And they require more labor for operation. But they usually offer larger capacity per oven, in spite of modest plant space requirements.

Byproduct ovens also offer shorter production cycles and higher coke yield—about 70 per cent of the coal charge vs. 67 per cent for semi-byproduct or mechanized nonrecovery ovens, and as low as 60 per cent for beehive ovens.

How the ovens differ: The byproduct ovens bake volatile material and impurities from the coal, without consuming an appreciable amount of the coke. The other types burn volatiles and impurities from the coal; they also consume some of the usable carbon.

Tests by the U. S. Bureau of Mines indicate that 2 to 3 per cent of usable carbon is lost in mechanized nonrecovery ovens; 4 to 10 per cent is lost in beehive ovens.

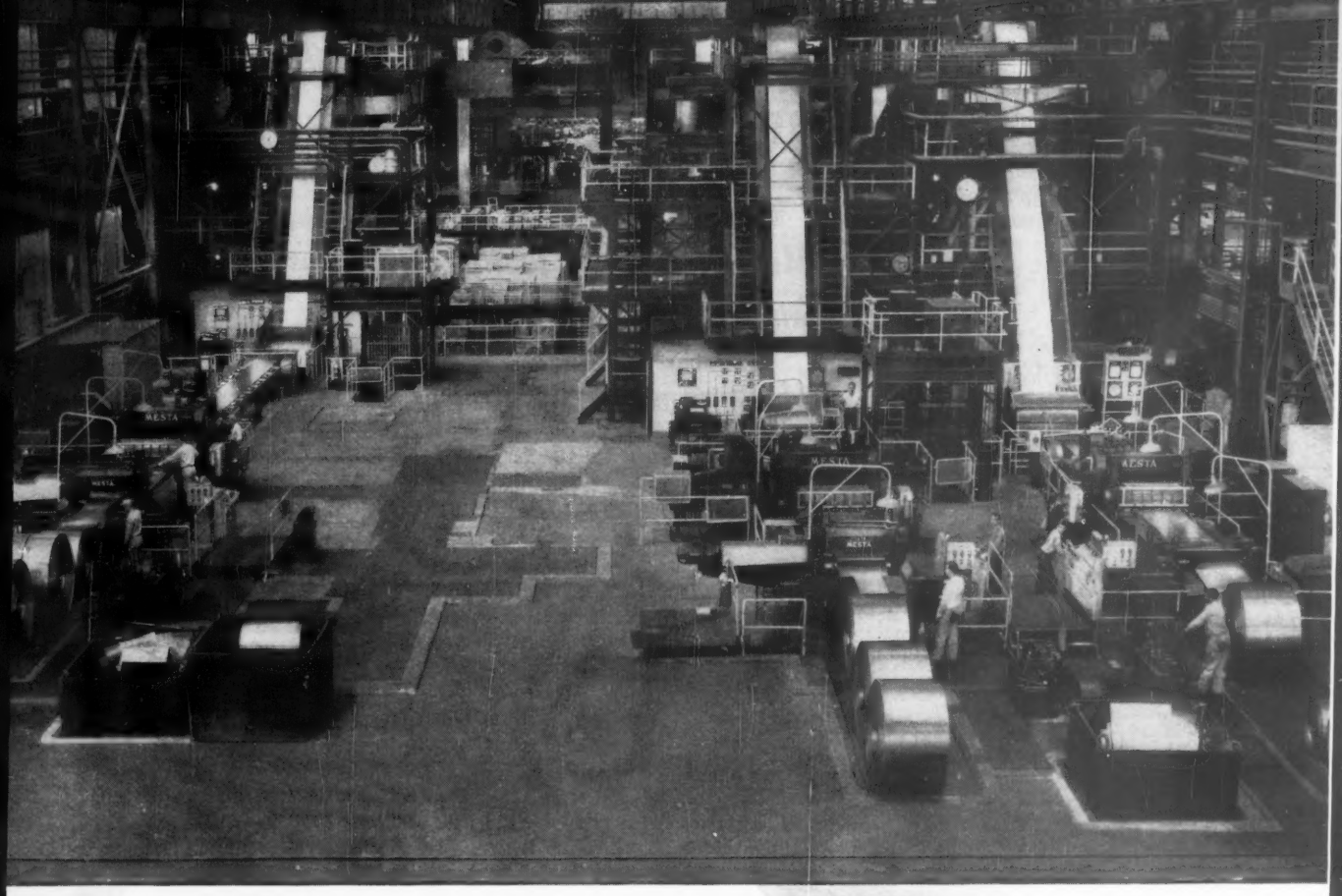
• Before large supplies of petrochemicals were available, revenue from byproducts often carried the cost of owning and operating coke ovens.

In some countries and under some conditions, sale of byproducts (including ammonium sulfate, benzol, toluol, xylol, naphthalene, and excess gas) bring up to $10 per ton of coal charged, after deducting the cost of sulfuric acid and other materials introduced for maximum byproduct recovery. In countries where synthetic ammonia and other coal chemical equivalents are available at low prices in other forms, the net value of all byproducts may drop as low as $4 per ton of coal charged.

Some experts express doubt that the value of chemicals from semi-byproduct ovens—tar and light oil—exceeds $5 per ton of coal charged under normal market conditions. And prices for naphthalene, one of the more valuable byproducts, will probably move downward as new petroleum naphthalene facilities go on stream. One of them, a 50 million lb per year plant at Catlettsburg, Ky., will be put into operation about Feb. 1 by Ashland Oil & Refining Co. Two others are expected to be in operation by the end of 1961; a 100 million lb per year plant will be operated at Toledo, Ohio, by Sun Oil Co., and a 225 million lb per year facility will be operated by Tidewater Oil Co. and Collier Carbon & Chemical Co. at Wilmington, Del.

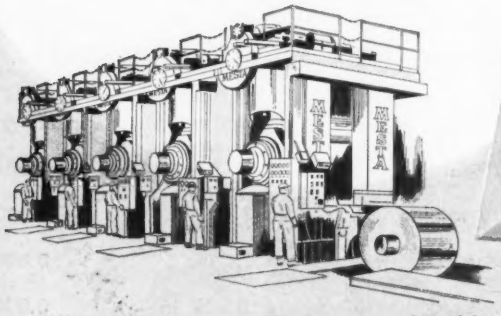
• The availability of coal and petrochemicals and the demand for them will determine future trends in coke ovens.

One large steel producer says it sold all the chemicals its ovens pro-



THREE MESTA 48" CONTINUOUS GALVANIZING LINES WITH FEED REELS, AUTOMATIC MASH WELDERS, TENSION REELS, AND ROTARY FLYING SHEARS WITH LEVELLERS.

Continuous galvanizing lines



Designed and Built by MESTA

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA

duced in 1960, and expects to repeat that performance this year. And some steel producers anticipate —some time in the future—a shrinkage of oil supplies and a return of coal byproduct markets. They are continuing to build or expand byproduct coke facilities, often without intending to recover chemicals at present.

Attractively priced petrochemicals have become so plentiful in some areas that recovery of coal chemicals is increasingly unattractive. In some plants, byproduct ovens are said to be operating on a nonrecovery basis; in others, chemicals are collected only to prevent air pollution.

More economical uses are being found for coke oven gas. Example: A liquid hydrogen plant being built by Linde Co., a division of Union Carbide Corp., New York. It'll produce 26 tons of hydrogen a day from coke oven gas at the Fontana (Calif.) plant of Kaiser Steel Corp.

In some cases, excess coke oven gas is being injected into blast furnace tuyeres to supply heat and serve as a reductant, lowering coke requirements. Mill operators welcome the additional fuel, but some observers say credits for the gases might not justify the capital investment required for the building of new byproduct ovens.

• Semi-byproduct ovens—some of them still on the drawing boards—may be a compromise.

Some of the semi-byproduct ovens are similar to rectangular, nonrecovery types, with equipment added for chemical recovery.

Cokemaking in a rotary hearth type furnace is in the pilot plant stage at Dorchester, Va. The method, developed by Salem-Brosius Inc., Pittsburgh, and New York Mining & Mfg. Co., New York, produces coke from low grade coal and permits recovery of byproducts.

Mechanization of nonrecovery ovens may be the answer for some coke producers. Three batteries of rectangular ovens (60 ovens per battery), with charging, leveling, and pushing equipment supplied by Connellsville Corp., Connellsville, Pa., are in operation at Stonega Coke & Coal Co.'s plant near Big Stone Gap, Va. (See STEEL, Jan. 18, 1960, pp. 94, 96.)

Nuclear Gage Has Many Uses

- ***Measurement and control of thickness, width, density, weight***
- ***Measurement and control of the amount of solids or liquids in storage vessels (blast furnaces; sand or resin bins)***
- ***Flaw detection in thick pieces***

PRACTICALLY any source of radiation can be employed with a new nuclear gage to check thickness and density of materials.

Heart of the Micro-Meter, as it is called, is a device classed as a scintillation counter. It is unusually sensitive and is noted for the low statistical variation of its readings, claims Radionics Inc., Norristown, Pa.

• The detector works with beta or gamma radiations. Applications range from thin tissue paper to steel more than 1 ft thick.

Sensitivity of the Micro-Meter depends on the source you choose. You simply select the one that fits material, thickness, and the degree of sensitivity you need. The tolerances measured are the same regardless of thickness. (See table below.)

Those who employ the gage can expect high speed performance. The system responds to changes in a little more than 10 milliseconds, says Dr. A. J. Stevens, Radionics president. For example, while measuring a strip moving at 5000 fpm (60 mph), the device will respond to a thickness change before the material has moved 1 ft.

• The instrument will perform other quality control functions beside thickness-density measurement.

The detector shape can be adapted to ferret out flaws in thick sections—hot steel blooms, nonferrous billets, solid propellent rocket engines. The levels of liquid or powder beds in storage tanks can be measured to within 1 per cent of any selected range. The device can also be adapted for checking widths and weights of slabs or sheets as well as the weighing of small parts, claims Radionics.

Radiation Sources and Their Sensitivity in Steel

	Type	Range	Sensitivity (in.)
Cobalt 60	gamma	to 10 in.	0.0012
Cesium 137	gamma	to 3 in.	0.0008
Bremsstrahlung	x-ray	to 0.4 in.	0.00025
Strontium 90	beta	to 0.025 in.	0.00001
Krypton 85	beta	to 0.003 in.	0.000002

Space Age Problems Advance Knowhow

SOLVING manufacturing problems brought about by Space Age metals has done more to spur advances in our production knowhow than any other single factor, manufacturing specialists attending a seminar in Dallas last week agreed.

Examples cited: Explosive forming, electron beam processing, and electrolytic shaping. Their development, or at least much of their commercial success, can be traced to the requirements of Space Age materials and products. And, most of the experts feel, the techniques will be used increasingly outside the aircraft and missile industries.

• The seminar, on Machining and Forming Space Age Metals, sponsored by the American Society of Tool & Manufacturing Engineers, turned up applications for most of the significant new manufacturing processes.

Included: Electron beam metalworking, plasma arc, electrolytics, chemical milling, and explosive forming, welding, joining, cutting.

Max J. Kuderko, supervisor of quality and product engineer, Vascoloy-Ramet Corp., Waukegan, Ill., reported that a niche has been established for ceramic cutting tools in machining difficult metals.

"Ceramics, with negative rakes, large lead angles, and large radiuses appear to be the best cutting tool combination for hard alloys," he said. In the group of metals where ceramics pay off, Mr. Kuderko includes Tantung G, Stellite, cobalt high speed steels, and AISI T-8 steels.

Work hardening alloys, like Hastelloy X, Inconel X, Udimet 500, Waspalloy, and the 200 and 300 series stainless steels, are machined more efficiently with carbides, Mr. Kuderko feels. The carbides he recommends are the tough, abrasion resistant grades (straight tungsten carbide-cobalt types, for example), and he says you'll need positive rakes and small radiuses for best results in most cases.

• Ceramic cutting tools may help relieve one of today's problem jobs: Taking the light finishing cut on a material that has been work hardened by previous cuts.

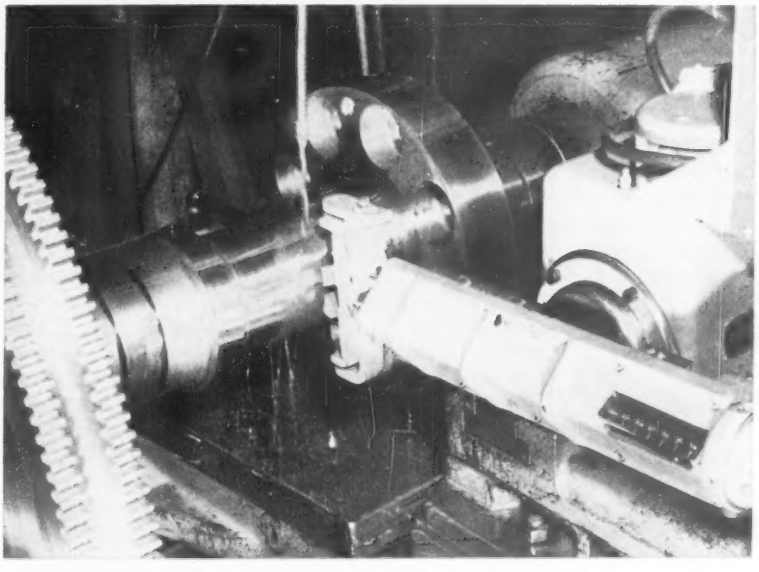
Mr. Kuderko told the ASTME seminar he had found the normal problem of notch wear in the cutting tools can often be eliminated by reducing the depth of cut so the hardened layer on the work is not penetrated. On work hardened 300 series stainless, for example, an unhoned ceramic insert ran the finish cut only 0.006 in. deep. The job was run at 600 surface feet a minute, 0.005 in. per revolution feed, and a ¾ in. length of cut. "Ninety pieces were produced with a finish of less than 60 microinches rms. The problem of notching at the depth of cut line was eliminated, apparently because the tool did not get below the work hardened surfaces. Wear remained even, and tool life was good."

In another session, F. W. Bolger and C. T. Olofson, Battelle Memorial Institute, Columbus, Ohio, emphasized the importance of rigidity of workpiece, machine, and tool in machining Space Age materials. They said proper support of the cutting edge is a must to prevent chipping and fracture.

Allegheny Ludlum to Join European Steel Venture

A new company that will produce and sell stainless and specialty steels in world markets will be formed by Allegheny Ludlum Steel Corp., Pittsburgh, and two Belgian firms, Evence Coppee et Cie, Brussels, and Societe Anonyme Metallurgique d'Esperance-Longdoz, Liege. Allegheny Ludlum will have equal ownership with the Belgians.

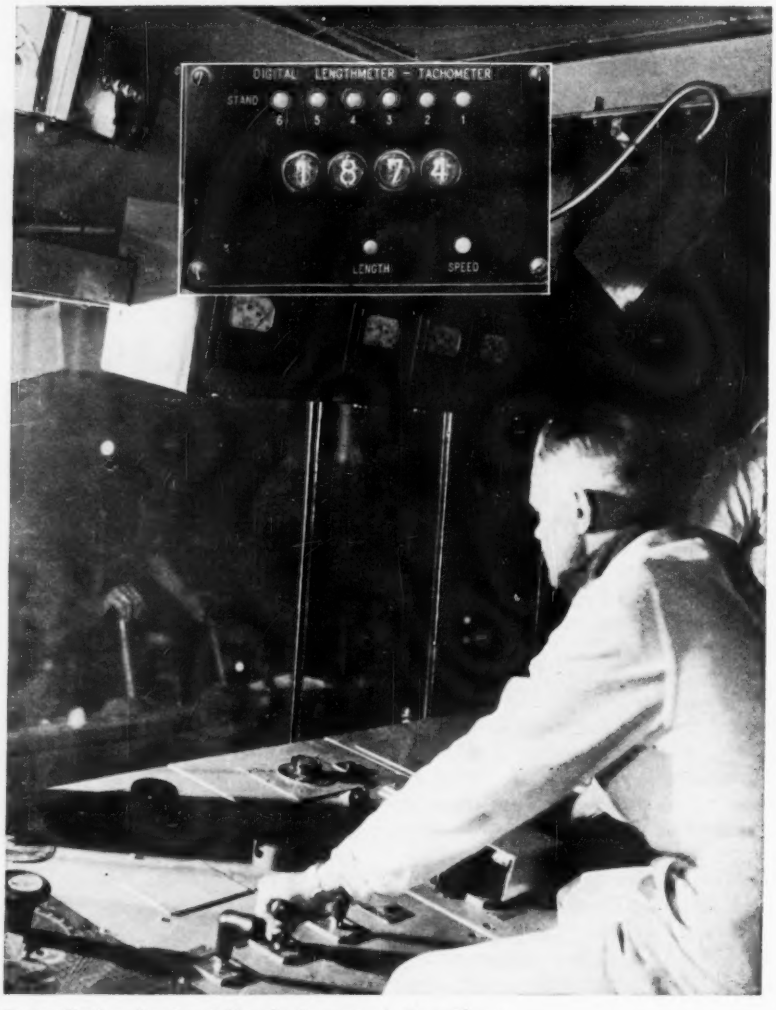
More than $10 million will be invested in a new plant which will have cold rolling and finishing facilities for supplying flat rolled products.



SUPERFINISHING ROTOR JOURNALS is said to take only 1 hour vs. 8 by grinding. A Gisholt Superfinisher attachment starts with a journal turned to 0.003-0.005 in. over top tolerance and delivers a 5 microinch finish, says Westinghouse Electric Co., Pittsburgh. Such units also enable that firm to refinish service damaged journals with the same time saving

Steel firm has better control, less waste when . . .

Electronics Measures Sheets, Checks Mill Stand Speeds



Data display (top) quickly checks operator's settings

IMPROVED ACCURACY and savings in time and labor are being realized in the cutting of steel strip while it is rolled through the use of an electronic device called a digital lengthometer and tachometer.

The unit is tied into operating equipment at the Vanderbilt Works, South African Iron & Steel Industrial Corp. (Iscor), Transvaal, Union of South Africa.

The system also measures the speed of any of six mill stands, displaying the information on units above the shear controls and at the operator's pulpit.

• The lengthometer works by counting the revolutions of the flying shear motor and the final mill stand. Tachometer accuracy is insured by timing the stand or shear motors with the pulses generated by a crystal oscillator. The result is displayed as direct motor speed.

Accuracy of the device is attributed to the large number of count pulses generated by each revolution of the drive motor. A flat disc with a number of equally spaced holes is coupled to each motor by a step-up gear unit. As the disc rotates, the holes interrupt a light-source photocell arrangement and generates about 5000 cps at normal running speed.

During operation, the pulses from the crystal oscillator are a timing reference for the electronic computer. The pulses generated during a timed interval are converted to appear visually on cold cathode (decade) counting tubes as the number of revolutions per minute. Circuits which process the information permit swift direct reading at either the main control panel or the operator's pulpit.

Formerly, the flying shear was manually adjusted to various fractions or multiples of the final mill stand speed. The ratio was changed to fit each length being cut.

Operators first read the final mill stand speed on a conventional foot per minute meter. It was entered on a graph which plotted revolutions per minute against mill speed. The operator then read off the required setting for the shear motor revolutions to obtain the right length.

Lack of accuracy was attributed to standard meter errors, difficulty in interpolating the graph, and the method of compensating for differences in roll diameters.

Welding Transformer Small In Size, Big in Performance

UNECONOMICALLY large, electric supply lines have been eliminated in a shop specializing in welding wire seat frames by adopting a resistance welding approach.

Other companies are using the same approach to make gas tank strap welds, join wheel stampings, and join hubs to wheel stampings.

The equipment used for welding seat frames takes up only one-third the floor space required by units previously employed, reports Charles Schwartz, welding engineer, Universal Wire Spring Div., Hoover Ball & Bearing Co., Bedford, Ohio.

He says the machines are simple and easy to maintain. It's possible to keep the company's press type machines in operation from one routine maintenance period to another where equipment previously used required maintenance at intervals less than 8 hours.

• The key to the approach is a small transformer that is capable of delivering necessary welding current and is impervious to the environment in the welding area.

It permits 76 welds to be made simultaneously in a two post weld press not a great deal larger than the part itself. The transformers are part of the tooling that holds all the parts in the proper position for welding. The weld dies are mounted directly on the transformers.

Mr. Schwartz adds that it would not be possible (without prohibitive overcrowding) to do all this welding in one machine using the conventional approach. With the power available in most plants, it would be necessary to fire the transformers in small groups.

• Use of moderately high frequency power accounts for the small size of the patented transformer.

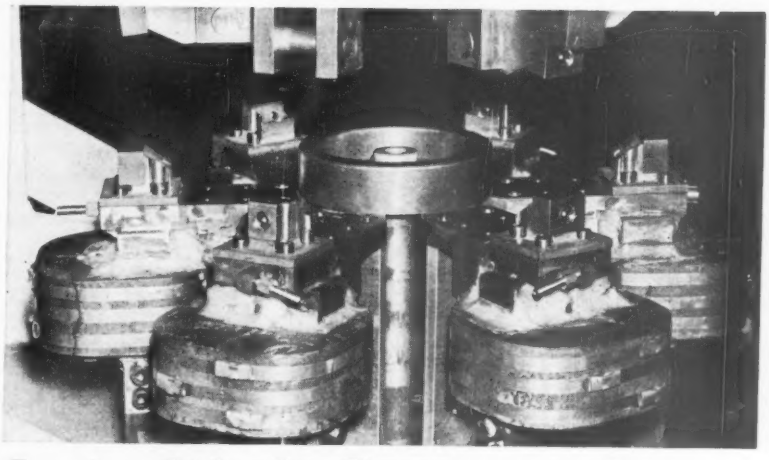
It's rugged enough to act as a mechanical portion of the weld circuit and withstand welding forces. A motor alternator converts line voltage (60 cycles) into a lower, more convenient voltage at high frequency.

• The peak energy that lines must supply is less than 10 per cent of what would be required in conventional setups and is supplied by all three phases.

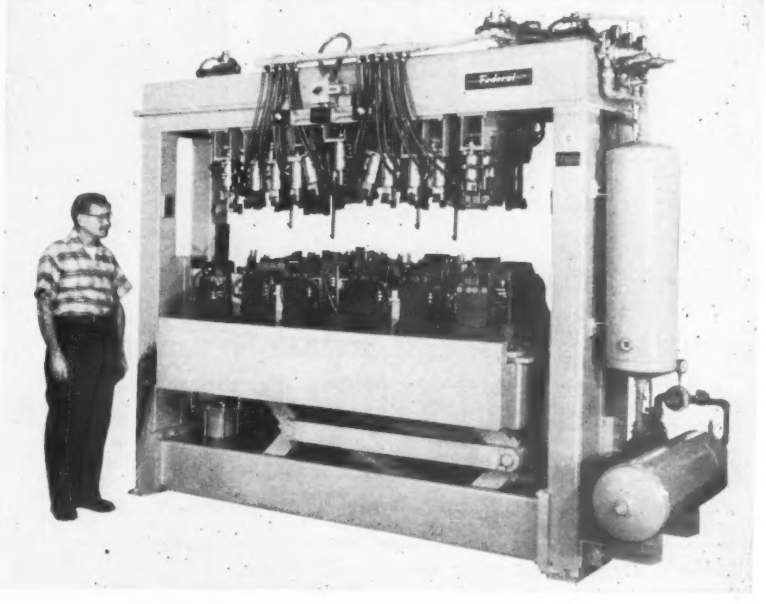
With a high inertia alternator, power is supplied to the system between welds in exactly the same way as a punch press absorbs power from the lines between hits. The speed of the alternator changes about 8 per cent while absorbing energy from the lines or giving it up to the weld.

The windings of the alternator are arranged for a multiplicity of voltages to add to the flexibility of the transformers which need only a minimum number of taps to meet a variety of welding situations.

Here it handles welding load in joining stampings



Even in multiples, less floor space is needed



THE WORLD'S MOST MODERN GRAVITY DROP HAMMER--

The IMPROVED **CECO-DROP**

with CECO BLOWMATIC PROGRAM CONTROLLER
(illustrated below)
Pre-selected pattern of long and short strokes for Semi-automatic Forging

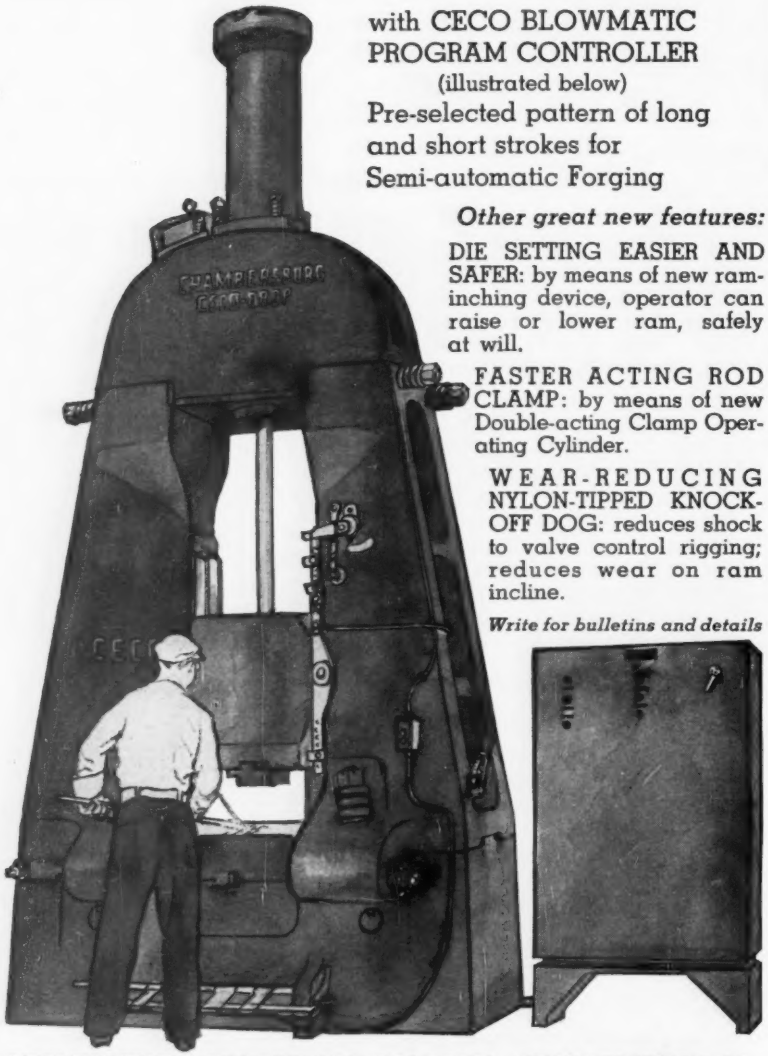
Other great new features:

DIE SETTING EASIER AND SAFER: by means of new ram-inching device, operator can raise or lower ram, safely at will.

FASTER ACTING ROD CLAMP: by means of new Double-acting Clamp Operating Cylinder.

WEAR-REDUCING NYLON-TIPPED KNOCK-OFF DOG: reduces shock to valve control rigging; reduces wear on ram incline.

Write for bulletins and details



CHAMBERSBURG ENGINEERING COMPANY • CHAMBERSBURG, PA.

CHAMBERSBURG

• The Hammer Builders •

DESIGNERS AND MANUFACTURERS OF THE IMPACTER

When it's a vital part, design it to be FORGED

Thermoelectric Generators Burn Any Type of Fuel

THERMOELECTRIC generators in ratings of 5, 10, 50, and 100 watts are typical of units made available for commercial and industrial applications by Westinghouse Electric Corp., Pittsburgh.

Since the generators are completely static and ideally suited for applications in remote locations, first uses will probably be in cathodic protection of pipelines, valve control, and for powering microwave relay equipment, says Westinghouse.

D. W. Gunther, manager of the Semiconductor Dept. (Youngwood, Pa.), adds that the company could design units to combine the use of any type of fuel and any type of cooling medium.

Gasoline, propane, or natural gas are typical fuels, while forced air, water, or natural convection could be used for cooling.

Depending on the application and the type of fuel used, the generators operate at core temperatures between 572 and 1112° F. Typical units burning propane operate at 752° F.

Outputs are generally low voltage, high current dc. A variety of static inverters or converters can be supplied to vary outputs.

• **One Application**—A 100 watt unit delivered to Northern Illinois Gas Co., Aurora, Ill., will be used for cathodic protection of pipelines and for charging batteries of a microwave relay communications system.

The generator is made of two, stacked, 50 watt sections. Propane is burned in an assembly at the base of the unit and the hot gases pass through a central, insulated chimney. A number of thermoelectric couples mounted around the outside of the chimney generate power as the heat is transferred through them.

The hot side of the couples operates at about 752° F. Anodized aluminum fins dissipate heat to the surrounding air. The unit weighs about 75 lb. The output of the basic generator is 11 volts at 10 amperes dc. A static converter operating at about 88 per cent efficiency changes this output to 48 volts at 2.1 amperes dc.

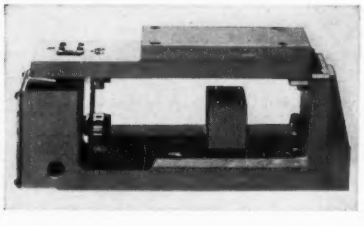
Force Transducer Measures Tension, Weight, Pressure

VARYING AMPLITUDE forces (such as tension, pressure, weight, thrust) can be automatically sensed and measured by the Hydro-Pneu-Tronics force transducer.

The key to the design accuracy of the mechanical to electrical unit is a system of cross-spring (flexure) pivots combined with a flat cantilever main spring.

The flexure pivots prevent any crosswise or lengthwise movement of the load platform, but allow flexure or bending in a third plane.

The heavy, flat cantilever spring and the flexure pivots permit direct mounting of load on the force transducer. Standard models can handle loads from 8 oz to 1500 lb. Special



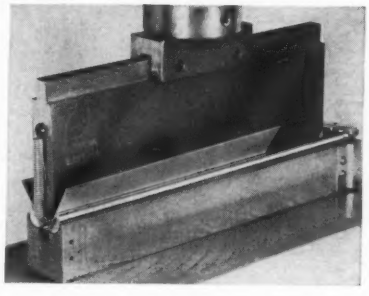
designs are available for loads up to 50,000 lb. Overloading will not damage the unit or cause a shift in calibration.

For further information, *write* Force Transducer Sales Div., Hydro-Pneu-Tronics Inc., 3666 E. 116th St., Cleveland 5, Ohio.

Quick Change Dies Aid in Wide Variety of Jobs

CHANGEABLE radius inserts are doing the job of several complete dies in punch presses and press brakes, says O'Neil-Irwin.

Radiuses from 0 to 3/8 in. can be formed by changing the insert (ten are provided with each die set). The smallest insert can be indexed to provide 0, 1/32, 1/16, and 3/32 in. radiuses. Combined with the other nine inserts, one set can form 13 radiuses.



The dies, called Snap-Form, are made for standard press brakes and punch presses. They are said to be especially helpful to those having a large variety of production jobs or who require quick die changeability for experimental forming. The shorter dies can be changed in less than 10 seconds, the longer ones in less than 1 minute, says the maker.

The dies are made of heat treated alloy steel with ground and polished inserts. Lengths run 6 in. to 12 ft.

For further information, *write* O'Neil-Irwin Mfg. Co., 619 Eighth Ave., Lake City, Minn.

Ceramic Burner Plates Produce Uniform Flame

A LINE of ceramic burner plates has been developed for equipment using gas as a fuel. The burners are said to produce a uniform blanket of flame high in infrared value over the entire surface.

The basic material in the plates is a silicon carbide with a high infrared emissivity and a low coefficient of expansion. Shapes such as rectangular plates, discs, and cylindrical tubes are available.

For further information, *write* Carborundum Co., P. O. Box 337, Niagara Falls, N. Y.

Liquid Surface Seal Protects Asphalt Floors

A LIQUID surface seal for protecting industrial floors is effective on mastic and asphalt.

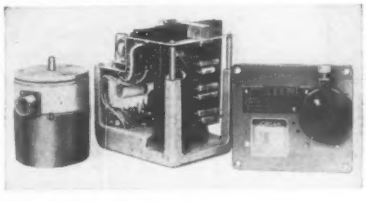
The material (Jennite J-16) stops floor dusting and is easy to clean. The coating is impervious to water. It resists petroleum derivatives (such as gasoline and motor oil), fats, sugars, gases, and fumes. It withstands most industrial chemicals and acids and is sparkproof. Silica sand can be combined with the top coat to provide a nonskid floor.

For further information, *write* Maintenance Inc., Wooster, Ohio.

High Accuracy Featured On Position Control Unit

HIGHLY ACCURATE positioning or position indicating are jobs for the Jordan control.

It can be tied into a wide range of machine tool applications. Other uses: Valve positioning, control of



variable speed drives, processes, or programing. It has resolutions of 1 part in 30,000 or better. In a typical machine tool application, setting to 0.001 in. is provided over a 30 in. travel.

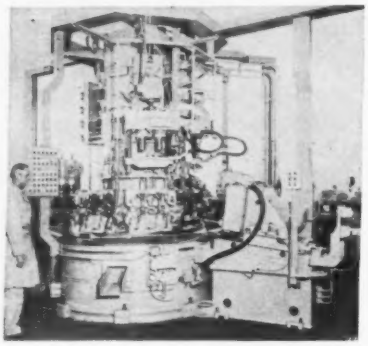
For further information, *write* Jordan Controls Inc., 3235 W. Hampton Ave., Milwaukee 9, Wis.

Center Column Machine Uses Standard Components

A CENTER column machine mills, drills, counterbores, and reams automotive steering knuckles at a rate of 120 pieces an hour at 100 per cent efficiency.

The unit has standard Snyder building block components including standard base, index table, fluid drive index mechanism, five slide units mounted on wing bases around the periphery of the base, and three slide units mounted on the machine column.

The machine base has circular T-



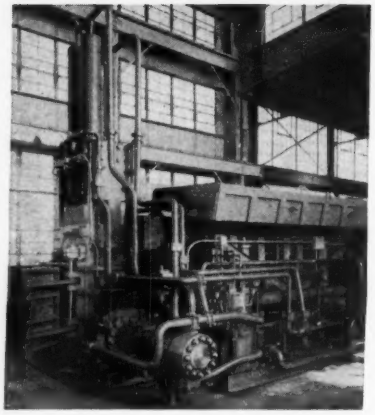
slots at top and bottom around its periphery that permit wing base units to be easily added, removed, or repositioned for future work changes. Hydraulic power for the machine is provided by a separate, motorized hydraulic pump and tank unit. The automatic lubrication system is pushbutton controlled.

For further information, *write* Snyder Corp., 3400 E. Lafayette, Detroit 7, Mich.

Heavy Material Handled By Scrap Shear, Baler

HEAVY SCRAP such as round shafts, bars, flat pieces, and auto and truck bodies (with frames) can be cut into lengths up to 60 in. A Logemann combination scrap shear and baler does the job.

It can also bale the cut body sections and sheet steel scrap into 12 x 18 in. high density blocks. The third dimension is determined by the type and amount of scrap. Bales weigh 125 to 300 lb in most cases, but heavier and longer bales can be made if necessary.



The press box is 20 ft long, 5 ft wide, and 5 ft deep. The tamper cover exerts 35 tons of crushing pressure. The side moves in with 105 tons of squeeze. The gathering ram develops 70 tons of pressure. The shear can apply 400 tons.

For further information, *write* Logemann Bros. Co., Milwaukee 45, Wis.

A SPECIAL INDEXING ARRANGEMENT AIDS PRODUCTION RATE in the fabrication of flywheel assemblies on this single station, rotary welding machine. The operation: Welding a ring gear (13¼ in. ID) to a hub with 12 equally spaced, 1⅛ in., CO_2, shielded arc, weld segments at a production rate of 171 assemblies an hour at 100 per cent efficiency. A continuous, running cam drive indexes the flywheel assembly. The cam groove is generated to produce a controlled constant velocity during welding and a controlled acceleration and deceleration, rapid and shockfree index, between the end of one welded segment and the beginning of the next. For further information, **write** Expert Welding Machine Co., 17144 Mt. Elliott Ave., Detroit 12, Mich.

Moisture in Air Supply Removed by Aftercooler

AN AFTERCOOLER for small and medium sized compressed air systems has no moving parts making it practically maintenance-free. Moisture in the air is condensed and removed by the cooling water.

It's built for capacities of 50 to 120 cu ft of free air per minute. A range of lengths from 40⅜ to 95¼ in. is available with cooling chamber 4½ in. in diameter. The unit is designed to cool air within 85 per cent of water temperature. Optional: Automatic cooling water shutoff and a horizontally designed unit which fits in overhead lines.

For further information, *write* Jas. A. Murphy & Co. Inc., 1421 E. High St., Hamilton, Ohio.

Surfaces Brightened By Rapid Quench Oil

A QUENCH oil (Voluta 921) for ferrous metals combines maximum surface brightness with rapid quench action. It's produced from high

grade base stocks with high oxidation resistance.

A possible benefit cited: In many cases, users may find they can dispense with finishing operations after a rapid quench.

For further information, *write* Shell Oil Co., 50 W. 50th St., New York 20, N. Y.

Hydraulic Lifts Put on Straddle Truck Carriers

INSTANT response and positive control provided by hydraulic lifting are cited as advantages of a series of 20,000 and 30,000 lb capacity straddle truck carriers.

Each carrier has two high pressure pumps, one to supply power for the load shoe swing and to raise and lower the load, the other to supply power for steering.

Hoist and swing control levers are on the steering column.

You have a choice of powerplants: A 153 hp gasoline or LP gas engine, or an 83 hp diesel unit. Power is

transmitted through a full reversing, four speed transmission and heavy duty drive train.

For further information, *write* Hyster Co., P. O. Box 847, Danville, Ill.

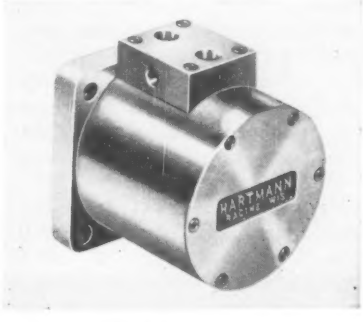
Hydraulic Motor Designed For Precision Equipment

ACCURATE control at all speeds is claimed for Hartmann's rotating vane type, hydraulic motor. The unit is designed for precision machine tools and equipment. Operation is smooth, pulseless, and noiseless even at extremely low speeds. It provides practically 100 per cent torque at stall and infinitely variable speed, says Hartmann.

One suggestion: Use as a servo motor with the addition of a high performance servo valve for speed control.

Three standard sizes are available. Displacements range from 2.2 to 7.6 cu in. per revolution; torque, 35 to 121 in.-lb per 100 psi; and horsepower output, 15 to 41.5.

Maximum speed is 1500 rpm. Pressure maximum is 2000 psi. The compact units range from 5⅛ to 7⅛ in. in diameter and are available for



NORTHEAST

Ohio Machine Builders, Inc.

SPECIAL MACHINERY AND EQUIPMENT FOR THE METALS INDUSTRIES

Friction and Hot Sawing Machines
Conveyors—pipe, plate, billets, sheet & strip
Mechanical equipment for Furnaces
Cooling Beds, Transfer Tables
Automatic Handling Tables for pipe, plate, sheet & strip
Pipe Stenciling, Weighing & Measuring Machines
Tension & Payoff Reels
Sheet & Plate Levellers, Descalers
Shears
Cleaning Lines
Special Machine Tools
Hot & cold tube spinning machines
Bar turning machines, Straighteners
Expanded Metal Machines

Northeast is staffed with a highly competent team of sales engineers, design engineers, purchasing and production specialists. All have been closely associated . . . having worked together as a coordinated team for a number of years. Engineers are professionally trained, with backgrounds in industry, and have wide experience in designing and building special machinery where exacting and unusual requirements are to be met.

One or more of these qualified specialists will, at your request, call upon you to discuss your operation. There is no obligation, of course.

NORTHEAST OHIO MACHINE BUILDERS, INC., 330 North Main St., Columbiana, Ohio

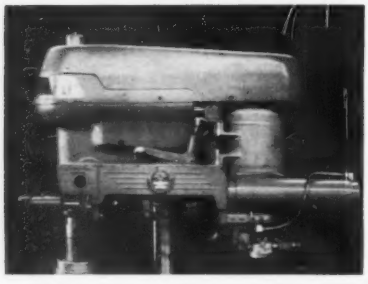
standard flange mounting, coupled use, and with double shaft extension. Models for special adaptations are available. Other standard sizes will be available soon.

For further information, *write* Hartmann Mfg. Co., 1637 Goold St., Racine, Wis.

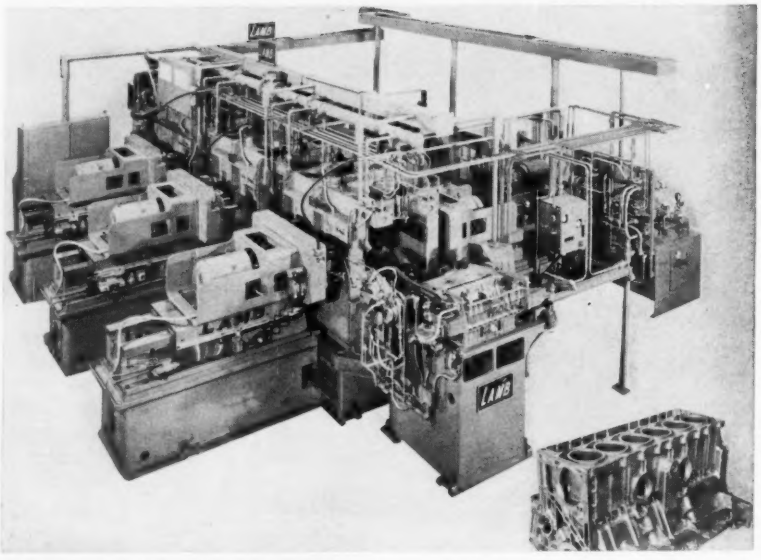
Maker of Drill Press Feeds Offers New Design

ANOTHER design of Beckett-Harcum's electrically and mechanically controlled, air powered, drill press feeds is now available.

The feeds are controlled by Beckett Hi-Cyclic air valves to provide rapid advance to the work, correct drill point thrust, accurate depth control, and rapid withdrawal. Drilling-tapping models will tap directly from a standard drill chuck or multiple drill head (eliminating use of such things as tapping heads, clutches, and lead screws).



For further information, *write* Beckett-Harcum Co., 985 W. Locust St., Wilmington, Ohio.



MACHINING FRONT AND REAR FACES of 131 cast aluminum blocks is an hour's job for this 12 station in-line machine. The unit can be quickly converted to cast iron block production through change gears in the work heads. Other features include a pivoting probe unit, quick change preset tools, and two station, single slide, machine construction. For further information, **write** F. Jos. Lamb Co., 5663 E. Nine Mile Rd., Detroit 34, Mich.

Motor Starter Handles Low Load Applications

A MOTOR STARTER for low load applications (compressors, pumps, blowers, and conveyors) is offered in a 2 hp, 00 size. The unit has only one moving part and operates with a ball bearing guided moving assembly consisting of movable magnet and contacts.

Straight line and vertical operation eliminate the possibility of accidental closing. Contacts are easily accessible. A screw driver can be used to remove the stationary contacts. The movable contacts snap in and out.

To facilitate maintenance, the company has designed the unit with many parts identical with its NEMA 0 starter.

For further information, *write* Federal Pacific Electric Co., 50 Paris St., Newark 1, N. J.

This Tapping Unit Can Be Operated in Any Position

A HEAVY duty tapping unit (TU 1400), 32 in. long, 10 15/16 in. wide, and 22½ in. high, can be supplied with a motor up to 10 hp.

The unit has a 6 in. maximum spindle travel, and can be used in any position (such as multiple station arrangements on fixed and indexing tables).

Built-in electrical relays allow automatic or manual cycling. Each unit is provided with a control panel and is capable of 30 reversals a minute.

It is equipped with an oil reservoir tank and a lubricating pump. All castings are aluminum alloy.

For further information, *write* Johnson Drill Head Co., Rockford, Ill.

Centrifugal Casting Unit Makes Cylinder Liners

THE MODEL MLS horizontal casting machine produces centrifugally cast iron cylinder liners at production rates.

It can produce liners of all sizes for reciprocating pumps and engines. Operation is almost automatic.

For further information, *write* Centrifugal Casting Machine Co., P. O. Box 947, Tulsa, Okla.

NEW literature

Write directly to the company for a copy

IR Wave Length Calibrators

Wave length calibrators for infrared spectrophotometers are available at no cost. A polystyrene film in one end of the calibrator may be inserted into the sample compartment of most infrared spectrophotometers. By comparing the spectral curve produced by the film with a polystyrene curve printed on the back of the calibrator, the operator is able to check the instrument for calibration, resolution, and stray light. Technical Information Dept., Scientific & Process Instruments Div., Beckman Instruments Inc., Fullerton, Calif.

Carbonyl Iron Powders

Physical, chemical, and electromagnetic characteristics of the 11 types of GAF carbonyl iron powders used in electronic cores, are described in a 28 page brochure (AP-100). More than 20 performance charts and tables are included. Antara Chemicals Div., General Aniline & Film Corp., Dept. 300, 435 Hudson St., New York 14, N. Y.

Aluminum Data

An eight page booklet lists 24 questions and answers about porcelain enameled aluminum. Dept. PRD-41, Reynolds Metals Co., Richmond 18, Va.

Data on Mounted Drives

Shaft mounted and flange mounted drives covering a torque range up to 44,000 lb-in. are described in a 36 page bulletin (7100). Design and construction advantages are included as well as selection and dimensional data, engineering drawings, accessories, and typical application photos. Falk Corp., Box 492, Milwaukee 1, Wis.

Grinding Wheel Standards

"American Standards Specifications for Standard Shapes and Sizes of Grinding Wheels," B74.2-1960, classifies, according to 12 end use categories, the shapes and sizes of grinding wheels considered standard by industry. Grinding Wheel Institute, 2130 Keith Bldg., Cleveland 15, Ohio.

Transformer Data

The functions of machine tool control transformers, and suggestions for determining the proper transformer for the application, are described in Catalog 141-B01. Acme Electric Corp., 111 Water St., Cuba, N. Y.

Standard Bearing Sizes

An 18 page brochure details 1066 standard bearing sizes. The stock list (S-60) includes Oilite bronze in cored, bar, plate stock, discs, strips, and Super Oilite in cored and bar stock. Amplex Div., Chrysler Corp., Box 2718, Detroit 31, Mich.

NEW BOOKS

Nonferrous Scrap Metal Guidebook, edited by Michael Suisman and Howard Wm. Rasher, National Association of Secondary Material Industries Inc., 271 Madison Ave., New York 16, N. Y., 135 pages, $25 ($5 for members)

The volume is the outgrowth of lectures given by members of the nonferrous secondary metal industry at the association's metal seminar held at Michigan State University Additional material, revisions, and metals not treated at the seminar have been included. Supplemental information such as charts, graphs, complete text of NF-58 (official scrap metal specifications), and a bibliography are also presented.

The Extrusion of Metals, C. E. Pearson and R. N. Parkins, John Wiley & Sons Inc., 440 Fourth Ave., New York 16, N. Y., 336 pages, $7.50

The second edition covers advances in extrusion, such as the theory of flow. The historical development of extrusion techniques is discussed in the first chapter. The balance of the book presents an account of extrusion practice relating to different classes of work and materials. Special extrusion methods which form a connecting link with forging are also detailed.

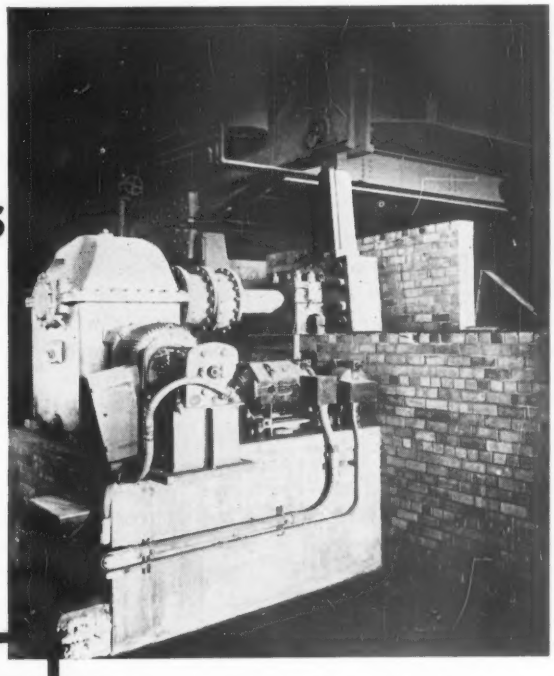
Energy in the American Economy, 1850-1975, S. H. Schurr and B. C. Netschert et al, Johns Hopkins Press, Homewood, Baltimore 18, Md., 774 pages, $12.50

Part 1 is an analytical history of more than a century in which fuel dominance shifted from wood to coal, oil, and gas, and which saw the rise of electrification. An assessment of future demands for energy is presented in Part 2. Many tables are shown. In Part 3, our future energy supply is discussed. The estimates are based on a survey of recent estimates of reserves and resources of coal, oil, gas, and hydropower. The treatment provides a basis for evaluating prospects for atomic, solar, or other possible energy sources.

Induction Heating: Coil and System Design, P. G. Simpson, McGraw-Hill Book Co. Inc., 330 W. 42nd St., New York 36, N. Y., 308 pages, $11.50

Practical methods for designing, building, and testing induction heating equipment are discussed. The methods are intended to meet current standards of quality at low initial and running costs. Engineering procedures covering the major areas of coils, power systems, and generating equipment are analyzed. Fundamental electromagnetic and heat flow theory are discussed as a basis for formulas from which practical designs can be developed. Curves, tables, nomograms, and illustrations are included to aid solving induction heat problems.

Tilting 700-tons of steel furnace



CONE-DRIVE GEARS

DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12

Here's a closeup of tilting mechanism for an electric furnace. Standard, stock model, double-reduction Cone-Drive **double-enveloping worm** gear speed reducer tilts furnace and heat with combined weight of 700 tons.

Powerful Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

Aren't you glad they look well-fed?

There's a tradition among relief agencies that pictures of starving kids touch more hearts and open more purses. As a matter of fact our files are bulging with such pictures. But for a change isn't it good to see the *results* of your generosity?

These three tots are orphaned citizens of Korea. Thanks to warm-hearted Americans, they're no longer hungry or cold. What made each one stand up so straight and proud—a pair of shoes from CARE. Maybe *your* dollars bought them.

Emergency clothing is only a small part of our work. The most blessed sight in thousands of villages and refugee camps is still the famous CARE food package. Yes, two-thirds of the world's people still go to sleep hungry, despite all the efforts of local governments, the U. N., and other agencies.

But something new and hopeful is under way, something we believe you will endorse wholeheartedly:

Wherever possible, CARE starts self-support programs. To boost food production, CARE supplies simple farm tools of steel to replace the ancient forked stick which barely scratches the soil. Carpenters' tools, fishing gear, masonry tools, sewing machines—tools which enable men and women to earn their own livelihood—transform your CARE dollars into the greatest gift one human being can bestow on another: the gift of dignity, born of self-reliance.

Food for empty stomachs, medicine for the sick, school kits, *tools for training towards self-support*—that's what your dollars buy through CARE. The need was never greater, the rewards never richer. Will you help plough the fertile earth—put tools into hands hungry for work, bread, and dignity?

CARE COOPERATIVE FOR AMERICAN RELIEF EVERYWHERE, INC. 660 FIRST AVE., NEW YORK 16, N. Y.

Here is $____ for food ☐ tools ☐ books ☐ medicine ☐ CARE's choice ☐

(PLEASE MAKE CHECKS PAYABLE TO CARE, INC.)

NAME_____

ADDRESS_____

(Space donated by this publication)

More Bright Spots Appearing

INQUIRIES and orders are on the upswing in nonautomotive markets, strengthening hopes that cutbacks in Detroit won't block the trend toward better steel demand.

As automakers push some of their February orders for sheets and bars into March, other consumers are taking up part of the slack. They're coming into the market for bigger tonnages than they've ordered in months—not because they're using steel at a faster rate but because they've carried inventory liquidation as far as they dare.

SMALLER USERS BUYING— In Chicago, the impact of having 5 to 15 per cent of February automotive shipments postponed is being softened to some extent by modest improvements in demand from other industries. In the East, there's a general upturn in buying by "miscellaneous" consumers—manufacturers of light tanks, shipping containers, hardware, shelving, and the like.

CANMAKERS ACCELERATE— As small consumers help stabilize demand for sheets and strip, seasonal factors are aiding other products and strengthening the total market for steel. In tin plate, for example, demand is swelling because canmakers are building inventories of finished goods. The uptrend is important because tin mill products normally account for more than 8 per cent of steel industry shipments.

HEAVY PRODUCTS GAIN— A revival also is showing in plates and shapes—not because of seasonal influences but because inventory liquidation is tapering off. January orders are the largest that some mills have seen since last May. Demand has recovered substantially from a December letdown caused by yearend tax considerations, bad weather, and the holidays. Summing up, a leading producer told STEEL: "Everything feels more solid. The inquiry level is better than it was, and the inventory problem seems to be behind us. It looks like we'll soon be shipping as much steel as fabricators are consuming."

OIL COUNTRY BRIGHTER—From tubemakers too there's better news: Some have booked more January business in oil country goods than they've sold in any month since last spring. Sales haven't climbed high enough to eliminate scheduling problems, but they've at least reached a volume that makes production planning a little easier. Improvement is most conspicuous in drill pipe—a product that has been at a standstill for months. Popular sizes of tubing and casing are moving out of downriver stocks at a good rate as major oil companies complete their inventory adjustments.

OUTLOOK FOR EXPORTS— Latest figures released by the Commerce Department show that the U. S. exported 284,000 net tons of steel mill products in November and imported 199,000 tons. Final figures for 1960 will probably show exports of 3.2 million tons and imports of 3.35 million—a foreign trade deficit of only 150,000 tons. In 1959, largely because of the 116 day strike that crippled U. S. output, imports topped exports by 2.7 million tons. This year, you can expect continued stiff competition from imported merchant wire, reinforcing bars, and standard pipe. But barring an unforeseen work stoppage, look for restoration of a favorable trade balance. Our exports will probably exceed imports by 600,000 tons.

OUTPUT EDGES UP— Steel ingot production in the week ended Jan. 21 advanced about 3 per cent to 1,525,000 net tons from the previous week's 1,482,000 tons. Reports to STEEL indicate that production is nearing a temporary plateau. This week's gain will probably be small.

WHERE TO FIND MARKETS & PRICES

	News	Prices
Bars, Merchant	74	77
Reinforcing	75	78
Boiler Tubes	...	80
Canada	87	83
Charts:		
Finished Steel	...	76
Ingot Rate	75	...
Scrap Prices	...	85
Clad Steel	...	81
Coal Chemicals	...	83
Coke	87	83
Comparisons	...	76
Electrodes	...	83
Fasteners	...	80
Ferroalloys	...	84
Fluorspar	...	83
Footnotes	...	80
Imported Steel	...	83
Ingot Production	75	...
Metal Powder	...	83
Nonferrous Met.	88	90
Ores	87	83
Pig Iron	87	82
Piling	...	77
Plates	91	77
Plating Material	...	91
Prestressed Strand	...	80
Price Indexes	...	76
Producers' Key	78	...
R.R. Materials	93	80
Refractories	...	83
Scrap	85	86
Semifinished	...	77
Service Centers	93	82
Sheets	74	78
Shipments	74	...
Silicon Steel	...	79
Stainless Steel	92	81
Strip	74	79
Structurals	87	77
Tin Mill Prod.	87	79
Tool Steel	87	81
Tubular Goods	92	81
Wire	75	79

Mill Shipments of Steel Products Show Good Gain

Mill shipments of finished steel products in November, 1960, totaled 4,516,200 net tons vs. 4.9 million in October and 4.8 million in November, 1959, reports the American Iron & Steel Institute. November shipments brought the total movement for the first 11 months of 1960 to 67,046,359 net tons, up noticeably from the 61.2 million moved in the same period of 1959.

Principal product shipments in the January-November period included: Cold rolled sheets (13,602,641 tons); hot rolled sheets (7,544,497); hot rolled bars, including light shapes (6,524,248); plates (5,755,959); electrolytic tin plate (4,836,139). Shipments of each product were larger than they were during the same period of strike-ridden 1959.

Shipments from the mills to the principal market classifications during the first 11 months included: Automotive (13,718,469 tons); warehouses (11,844,854); construction, including maintenance (9,093,461); containers (6,111,835); machinery, industrial equipment, and tools (3,743,065).

Steel Production in 1960 Sixth Largest in History

Production of ingots and steel for castings in 1960 totaled 99,277,760 net tons, sixth highest annual output in history, reports the American Iron & Steel Institute. The total was more than 5.8 million tons above 1959 output and was only 15 per cent below the record 117 million tons produced in 1955.

The institute reported output in the last half was only 38,523,665 tons compared with 60,754,095 in the first six months. Fourth quarter's production was 18,876,320 tons vs. 19,647,345 in the third quarter.

Output totaled 5,836,000 tons in December vs. 6,171,940 in the preceding month.

Steel Ingot Production—December, 1960

Period	OPEN HEARTH (Net tons)	BESSEMER (Net tons)	OXYGEN PROCESS (Net tons)	ELECTRIC (Net tons)	TOTAL (Net tons)	Percentage of capacity
1960						
January	10,510,616	211,132	280,981	1,046,675	12,049,404	95.5
February ...	9,715,527	215,263	245,458	949,558	11,126,806	94.3
March	10,103,122	202,812	306,741	952,008	11,564,683	91.6
1st Qtr	30,329,265	630,207	833,180	2,948,241	34,740,893	93.8
April	8,603,306	105,336	302,763	766,452	9,777,857	80.1
May	7,844,140	73,010	309,505	603,817	8,830,472	70.0
June	6,441,594	80,344	314,766	568,169	7,404,873	60.6
2nd Qtr	22,889,040	258,690	927,034	1,938,438	26,013,202	70.2
1st Half ...	53,218,305	888,897	1,760,214	4,886,679	60,754,095	82.0
July	5,494,331	61,700	289,003	505,890	6,350,924	50.3
August	5,860,394	52,652	279,550	645,404	6,838,000	54.2
September ..	5,525,244	42,228	287,323	603,626	6,458,421	52.9
3rd Qtr. ...	16,879,969	156,580	855,876	1,754,920	19,647,345	52.5
9 Mo.	70,098,274	1,045,477	2,616,090	6,641,599	80,401,440	72.1
October	5,917,780	56,914	270,450	623,236	6,868,380	54.4
*November .	5,308,894	51,246	257,286	554,514	6,171,940	50.5
†December .	5,046,000	36,000	202,000	552,000	5,836,000	46.3
†4th Qtr. ..	16,272,674	144,160	729,736	1,729,750	18,876,320	50.4
†2nd 6 Mo. .	33,152,643	300,740	1,585,612	3,484,670	38,523,665	51.4
†Totals	86,370,948	1,189,637	3,345,826	8,371,349	99,277,760	66.8
1959						
January	8,280,985	120,005	186,820	729,575	9,317,385	74.3
February ...	8,541,031	128,515	176,970	756,422	9,602,938	84.8
March	10,216,474	184,892	236,565	929,784	11,567,745	92.3
1st Qtr	27,038,490	433,412	600,385	2,415,781	30,488,068	83.8
April	9,884,322	195,730	237,018	964,850	11,281,920	93.0
May	10,117,968	200,887	257,325	1,024,401	11,600,581	92.5
June	9,521,053	185,794	259,731	941,056	10,907,634	89.9
2nd Qtr	29,523,343	582,411	754,074	2,930,307	33,790,135	91.8
1st 6 Mo. ..	56,561,833	1,015,823	1,354,459	5,346,088	64,278,203	87.8
July	4,541,741	66,433	98,634	525,368	5,232,176	41.7
August	1,171,342	.....	.....	267,935	1,439,277	11.5
September ..	1,249,398	.....	.....	285,619	1,535,017	12.7
3rd Qtr	6,962,481	66,433	98,634	1,078,922	8,206,470	22.1
9 Mo.	83,524,314	1,082,256	1,453,093	6,425,010	72,484,673	65.6
October	1,385,490	.....	.....	319,043	1,704,533	13.6
November ..	6,290,659	92,361	129,794	754,793	7,267,607	59.9
December ..	10,468,534	205,666	281,451	1,033,668	11,989,319	95.6
4th Qtr	18,144,683	298,027	411,245	2,107,504	20,961,459	56.3
2nd 6 Mo. ..	25,107,164	364,460	509,879	3,186,426	29,167,929	39.2
Totals	81,668,997	1,380,283	1,864,338	8,532,514	93,446,132	63.3

Note—The percentages are based on annual capacities as of Jan. 1, 1960: Open hearth, 126,621,630 net tons; bessemer, 3,396,000 net tons; basic oxygen process, 4,157,400 net tons; electric and crucible, 14,395,940 net tons. Total: 148,570,970 net tons. In 1959, the capacity tonnages were: Open hearth, 126,528,380 net tons; bessemer, 3,577,000 net tons; basic oxygen process, 4,033,160 net tons; electric and crucible, 13,495,130 net tons. Total: 147,633,670 net tons.
†Preliminary. *Revised.

Shieldalloy: U. S. Producer Of Ferrocolumbium

IN STEEL's Jan. 9 story, "Columbium Hailed as Real Comer," four companies were listed on Page 92 as producers of ferrocolumbium in the U. S.

The list should have included Shieldalloy Corp., which produces ferrocolumbium at its Newfield, N. J., plant.

In addition, Shieldalloy imports pure columbium metal from the Hermann C. Starck organization of Goslar, West Germany, which Shieldalloy represents on an exclusive marketing basis in the U. S.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 78 & 79

Despite deferments in automotive orders, sheet steel demand has shown slight improvement from a diversity of consuming outlets. January shipments will at least equal December's volume. There's no tightening in shipment promises, which run two weeks on hot rolled, two to four weeks on cold rolled, and two to three weeks on galvanized. Midwest Steel Div., National Steel Corp., has started shipping galvanized sheets from its newly constructed plant in Portage, Ind. (Chicago area).

Appliance makers are holding down their output of finished items to avoid overloading distributors. Also, housing is off seasonally, and the service centers are not pressing the mills for shipments. At the same time, requirements for shipping containers, door bucks, shelving, and light tanks are fairly active.

Steel Bars . . .

Bar Prices, Page 77

Production cutbacks by the auto industry are hurting the steel bar market, though sellers at some points report demand is running a little ahead of that a month ago. Inquiry is fairly well diversified, but adequate consumer inventories are reported everywhere. Generally, users are relying on mills to give them prompt shipments when they need tonnage.

Deliveries, as a rule, are available in two to four weeks. Even better can be done where consum-

ers are lucky enough to catch immediate rolling. In the case of cold drawn bars, prompt shipments are available; in instances where the cold drawers have hot bar stocks, shipments are possible within a few days after receipt of an order.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 78

Although seasonal factors are contributing a high degree of sluggishness in current demand, substantial tonnages of reinforcing steel bars continue to move. Northwest Steel Rolling Mills Inc., Seattle, has increased its order backlog by 6000 tons and resumed operation Jan. 16 after a week's shutdown. On the other hand, Republic Steel's Truscon Steel Div. at Youngstown is scheduled to close for the week beginning Jan. 22.

Wire . . .

Wire Prices, Pages 79 & 80

Demand for wire products is reported edging upward, but it's far from brisk. Merchant wire items can be had from stock, and manufacturers' wire is available for delivery within two to three weeks on most grades. Imports are still cutting into domestic business, particularly in areas adjacent the seacoasts.

Copperweld Steel Co., Glassport, Pa., has booked a contract for stainless fabric squares and side and twist wires from the U. S. Engineer, Memphis, Tenn., at $3,853,955.

Steel Ingot Output Tops 1.5 Million Ton Mark

Steel ingot output has passed the 1.5 million ton mark for the first time since the week ended Oct. 29. STEEL estimates production for the week ended Jan. 21 at 1,525,000 net tons, a gain of 2.9 per cent above the previous week's total.

Operating schedules are expected to level off soon. The rate is within the zone of stability that prevailed for 16 weeks last year (July-October) when weekly output averaged 1,527,000 tons.

- **Youngstown** — Steel mills are turning out the largest tonnages of ingots since October. The improvement follows an upturn in buying and efforts of at least one producer to augment his finished steel inventory.
- **Buffalo**—Steelmaking operations are increasing as a result of improved business. The gain in orders has been general.
- **Birmingham**—Production is rising rapidly. It has reached the highest level since mid-July of last year.
- **Los Angeles**—Only minor changes in operating schedules are reported by mills in the West. Production is expected to hold steady through February.
- **Detroit** — Steelmaking operations may dip slightly here this week. Several mills indicate they may cut production schedules. The district has been operating at an index rate of 99 (100 equals average weekly production in 1957-59), the highest of any district in the country.
- **Cincinnati**—A slight increase in ingot production is anticipated here this week, but the cutback in auto production is expected to force a reduction in steelmaking within a few weeks.
- **Philadelphia** — Ingot production will show little change this week. Inventories of finished steel held by numerous consumers are at rock bottom. That development and prospects for a seasonal pickup contribute to optimism for a February pickup.
- **Cleveland**—Whether cutbacks in automotive steel requirements will hurt steelmaking operations in this area remains to be seen. District mills are large suppliers to the auto industry. The latest steel production index for the district (week ended Jan. 14) was 77, unchanged from the preceding week. Observers don't anticipate much change in the immediate future.

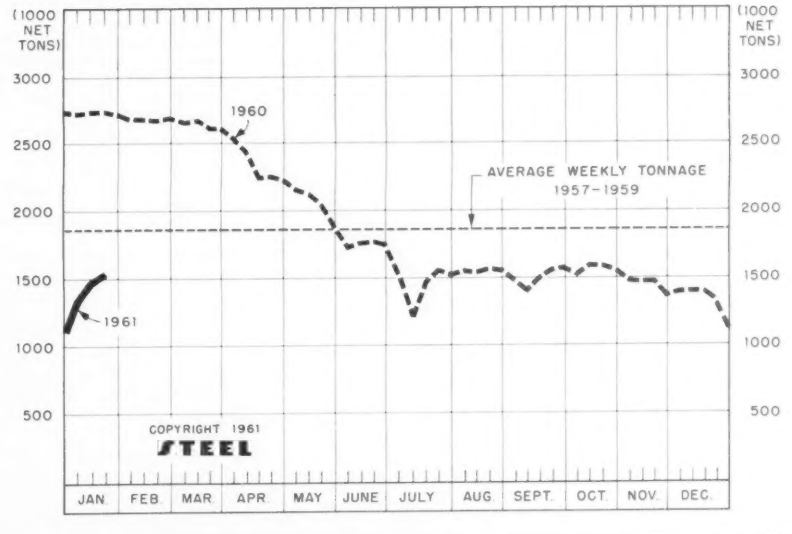
STEEL INGOT PRODUCTION

Weeks Ended	Net Tons	Change
Jan. 21	1,525,000*	+ 2.9%
Jan. 14	1,482,000	+ 8.9%
Jan. 7	1,361,000	+23.4%
Totals to Date		
1961	2,843,000	−47.8%
1960	5,442,000	

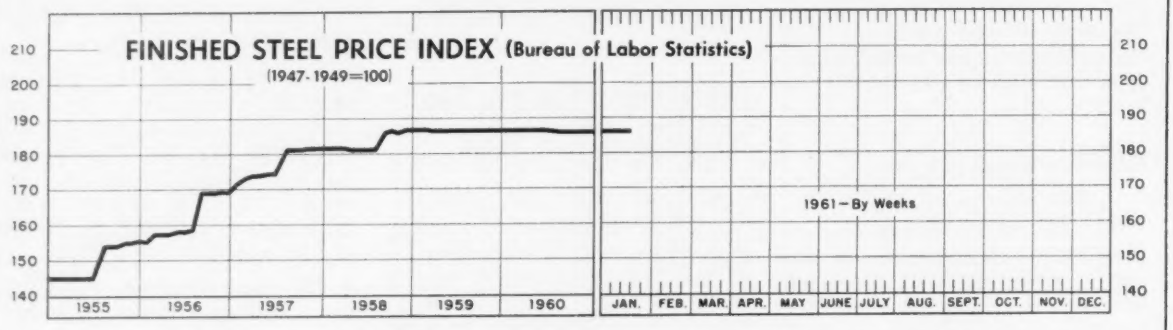
INDEX BY DISTRICTS

1957-1959=100	Weeks Ended Jan. 14	Weeks Ended Jan. 7
Northeastern	83	70
Buffalo	68	59
Pittsburgh	70	62
Youngstown	73	58
Cleveland	77	77
Detroit	99	99
Chicago	86	85
Cincinnati	76	76
St. Louis	78	63
Southern	80	77
Western	90	85
Total Industry	79.6	73.1

*Estimated by STEEL.



Price Indexes and Composites



Jan. 17, 1961	Week Ago	Month Ago	Dec. Index	Year Ago
186.2	186.2	186.2	186.2	186.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Jan. 17

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, H.R., Carbon	6.675
Rails, Light, 40 lb	7.292	Bars, Reinforcing	6.335
Tie Plates	6.875	Bars, C.F., Carbon	10.710
Axles, Railway	10.175	Bars, C.F., Alloy	14.125
Wheels, Freight Car, 33 in. (per wheel)	62.000	Bars, C.F., Stainless, 302 (lb)	0.570
Plates, Carbon	6.350	Sheets, H.R., Carbon	6.350
Structural Shapes	6.167	Sheets, C.R., Carbon	7.300
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, Galvanized	8.775
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloys, High Speed, W18 Cr 4, V 1 (lb)	1.895	Strip, C.R., Carbon	9.489
Bars, H.R., Alloy	10.775	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Stainless, 303 (lb)	0.543	Strip, H.R., Carbon	6.250
		Pipe, Black, Buttweld (100 ft)	19.495
		Pipe, Galv., Buttweld (100 ft)	23.098
		Pipe, Line (100 ft)	195.430
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	194.268
		Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (Bundles)	7.647
		Nails, Wire, 8d Common	9.433
		Wire, Barbed (80-rod spool)	8.414
		Woven Wire Fence (20-rod roll)	21.003

STEEL's FINISHED STEEL PRICE INDEX

	Jan. 18 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	209.10
Index in cents per lb	6.713	6.713	6.713	6.713	5.665

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$128.00
No. 2 Fdry, Pig Iron, GT.	66.49	66.49	66.49	66.49	58.99
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	58.49
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	59.77
Steelmaking Scrap, GT	32.17	31.83	29.00	42.33	53.33

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Jan. 18 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.97	5.97	5.97	5.975	4.90
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.90
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.745	5.745	5.745	5.77	4.88
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.80
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.80
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.25
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.25-6.35
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.60
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.45

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.40	6.40	6.40	6.40	5.025

PIG IRON, Gross Ton	Jan. 18 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$59.50
Basic, Valley	66.00	66.00	66.00	66.00	58.50
Basic, deld., Philadelphia	70.18	70.18	70.18	70.41	62.16
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, deld., Phila.	70.68	70.68	70.68	70.91	62.66
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	55.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	59.00
Malleable, Chicago	66.50	66.50	66.50	66.50	59.00
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	205.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$29.50	$29.50	$26.50	$42.50	$54.50
No. 1 Heavy Melt, E. Pa.	36.00	35.00	34.00	42.00	55.00
No. 1 Heavy Melt, Chicago	30.50	31.00	26.50	42.50	50.50
No. 1 Heavy Melt, Valley	32.50	32.50	26.50	44.50	58.50
No. 1 Heavy Melt, Cleve.	28.50	28.50	23.50	41.50	54.50
No. 1 Heavy Melt, Buffalo	27.50	25.50	23.50	37.50	47.50
Rails, Rerolling, Chicago	54.50	54.50	48.50	62.50	72.50
No. 1 Cast, Chicago	39.50	39.50	37.50	55.50	51.50

COKE, Net Ton					
Beehive, Furn., Connlsvl	$15.00	$15.00	$15.00	$15.00	$14.125
Beehive, Fdry., Connlsvl	18.25	18.25	18.25	18.25	16.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	27.50

Steel Prices

Mill prices as reported to STEEL, Jan. 18, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 78; footnotes, page 80.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ....$76.00

INGOTS, Alloy (NT)
Detroit S41 ....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 ....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 ....82.00
Sharon,Pa. S3 ....82.00

BILLETS, BLOOMS & SLABS Carbon Rerolling (NT)
Bartonville,Ill. K4 ...$82.00
Bessemer,Pa. U5 ....80.00
Buffalo R2 ....80.00
Clairton,Pa. U5 ....80.00
Ensley,Ala. T2 ....80.00
Fairfield,Ala. T2 ....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 ....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 ....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ...80.00
Sterling,Ill. N15 ....80.00
Youngstown R2 ....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 ....99.50
Canton,O. R2 ....102.00
Clairton,Pa. U5 ....99.50
Conshohocken,Pa. A3 .104.50
Ensley,Ala. T2 ....99.50
Fairfield,Ala. T2 ....99.50
Farrell,Pa. S3 ....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 ....99.50
Geneva,Utah C11 ....99.50
Houston S5 ....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 ....109.00
Midland,Pa. C18 ....99.50
Munhall,Pa. U5 ....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 ....109.00
Sharon,Pa. S3 ....99.50
S.Chicago R2, U5, W14 .99.50
S.Duquesne,Pa. U5 ...99.50
S.SanFrancisco B3 ...109.00
Warren,O. C17 ....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$119.00
Bridgeport,Conn. C32 ..119.00
Buffalo R2 ....119.00
Canton,O. R2, T7 ..119.00
Conshohocken,Pa. A3 .126.00
Detroit S41 ....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 ....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 ....119.00
Houston S5 ....124.00
Ind.Harbor,Ind. Y1 ...119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2. .119.00
LosAngeles B3 ....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 ....119.00
Midland,Pa. C18 ....119.00
Munhall,Pa. U5 ....119.00
Owensboro,Ky. G8 ....119.00
Seattle(6) B3 ....140.00
Sharon,Pa. S3 ....119.00
S.Chicago R2,U5,W14 .119.00
S.Duquesne,Pa. U5 ...119.00
Struthers,O. Y1 ....119.00
Warren, O. C17 ....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ....$122.50
Canton,O. R2 ....125.00
Cleveland R2 ....122.50
Gary,Ind. U5 ....122.50
S.Chicago,Ill. R2,W14 .122.50
S.Duquesne,Pa. U5 ...122.50
Warren,O. C17 ....122.50

SKELP
Aliquippa,Pa. J5 ....5.05
Benwood,W.Va. W10 ...5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 ....5.05
Pittsburgh J5 ....5.05
Warren,O. R2 ....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 ....6.40
Alton,Ill. L1 ....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 ....6.40
Cleveland A7 ....6.40
Donora,Pa. A7 ....6.40
Fairfield,Ala. T2 ....6.40
Houston S5 ....6.65
IndianaHarbor,Ind. Y1..6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 ....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 ....6.50
LosAngeles B3 ....7.20
Minnequa,Colo. C10 ...6.65
Monessen,Pa. P7 ....6.40
Pittsburg,Calif. C11 ...7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 ....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 ....6.50
Struthers,O. Y1 ....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ...5.50
Aliquippa,Pa. J5 ....5.50
Atlanta A11 ....5.70
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa. B2 ....5.55
Birmingham C15 ....5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.30
Gary,Ind. U5 ....5.50
Geneva,Utah C11 ....5.50
Houston S5 ....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 ....5.55
Joliet,Ill. P22 ....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 ....6.20
Minnequa,Colo. C10 ...5.80
Munhall,Pa. U5 ....5.50
Niles,Calif. P1 ....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 ....6.25
S.Chicago,Ill. U5, W14 .5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 ....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 ....5.50
Sterling,Ill. N15 ....5.50
Weirton,W.Va. W6 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....6.90
Munhall,Pa. U5 ....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 ....8.05
Bessemer,Ala. T2 ....8.05
Bethlehem,Pa. B2 ....8.10
Clairton,Pa. U5 ....8.05
Fairfield,Ala. T2 ....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 ....8.05
Geneva,Utah C11 ....8.05
Houston S5 ....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 ....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 ....8.75
Munhall,Pa. U5 ....8.05
Seattle B3 ....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 ....7.75
Struthers,O. Y1 ....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 ....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 ....8.05
S.Chicago,Ill. U5 ....8.05
Sterling,Ill. N15 ....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 ....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 ....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 ....5.50
Bessemer,Ala. T2 ....5.30
Clairton,Pa. U5 ....5.30
Claymont,Del. P4 ....5.30
Cleveland J5, R2 ....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 ....5.30
Fairfield,Ala. T2 ....5.30
Farrell,Pa. S3 ....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 ....5.30
Geneva,Utah C11 ....5.30
GraniteCity,Ill. G4 ....5.40
Houston S5 ....5.40
Ind.Harbor,Ind. I-2, Y1 .5.30
Johnstown,Pa. B2 ....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 ....5.30
Minnequa,Colo. C10 ...6.15
Munhall,Pa. U5 ....5.30
Newport,Ky. A2 ....5.30
Pittsburgh J5 ....5.30
Riverdale,Ill. A1 ....5.30
Seattle B3 ....6.20
Sharon,Pa. S3 ....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 ....5.30
Steubenville,O. W10 ...5.30
Warren,O. R2 ....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. P4 ....7.05
Fontana,Calif. K1 ....7.85
Geneva,Utah C11 ....7.05
Houston S5 ....7.15
Johnstown,Pa. B2 ....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ....7.95
Ashland,Ky. A10 ....7.95
Bessemer,Ala. T2 ....7.95
Clairton,Pa. U5 ....7.95
Claymont,Del. P4 ....7.95
Cleveland J5, R2 ....7.95
Coatesville,Pa. L7 ....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 ....7.95
Ecorse,Mich. G5 ....7.95
Fairfield,Ala. T2 ....7.95
Farrell,Pa. S3 ....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 ....7.95
Geneva,Utah C11 ....7.95
Houston S5 ....8.05
Ind.Harbor,Ind. I-2, Y1.7.95
Johnstown,Pa. B2 ....7.95
Munhall,Pa. U5 ....7.95
Pittsburgh J5 ....7.95
Seattle B3 ....8.85
Sharon,Pa. S3 ....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Sterling,Ill. N15 ....7.625
Warren,O. R2 ....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 ....7.50
Claymont,Del. P4 ....7.50
Coatesville,Pa. L7 ....7.50
Economy,Pa. B14 ....7.50
Farrell,Pa. S3 ....7.50
Fontana,Calif. K1 ....8.30
Gary,Ind. U5 ....7.50
Houston S5 ....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 ....7.50
Lowellville,O. S3 ....7.50
Munhall,Pa. U5 ....7.50
Newport,Ky. A2 ....7.50
Pittsburgh J5 ....7.50
Seattle B3 ....8.40
Sharon,Pa. S3 ....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 ....7.50

FLOOR PLATES
Cleveland J5 ....6.375
Claymont,Del. P4 ....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ....6.375
Munhall,Pa. U5 ....6.375
Pittsburgh J5 ....6.375
S.Chicago,Ill. U5 ....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ...5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R2 ....6.05
Warren,O. R2 ....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 ....5.875
Atlanta(9) A11 ....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ...5.675
Buffalo(9) R2 ....5.675
Canton,O.(23) R2 ....6.15
Clairton,Pa.(9) U5 ...5.675
Cleveland(9) R2 ....5.675
Ecorse,Mich.(9) G5 ...5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 ...5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 ....5.675
Houston(9) S5 ....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 ....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 ....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 ....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11.6.375
Pittsburgh(9) J5 ....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle(9) A24,B3,N15 .6.425
S.Ch'e'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11 .6.375
Warren,O. C17 ....6.025
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.725
Bethlehem,Pa. B2 ....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 ....6.725
Canton,O. R2, T7 ....6.725
Clairton,Pa. U5 ....6.725
Detroit S41 ....6.725
Economy,Pa. B14 ....6.725
Ecorse,Mich. G5 ....6.725
Farrell,Pa. S3 ....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 ....6.725
Houston S5 ....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 ....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 ....7.775
Lowellville,O. S3 ....6.725
Massillon,O. R2 ....6.725
Midland,Pa. C18 ....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 ....6.725
Seattle(6) B3 ....7.825
Sharon,Pa. S3 ....6.725
S.Chicago R2, U5, W14..6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 ....6.725
Warren,O. C17 ....6.725
Youngstown U5 ....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 ....8.30
Bessemer,Ala. T2 ....8.30
Bethlehem,Pa. B2 ....8.30
Clairton,Pa. U5 ....8.30
Cleveland R2 ....8.30
Ecorse,Mich. G5 ....8.30
Fairfield,Ala. T2 ....8.30
Fontana,Calif. K1 ....9.00
Gary,Ind. U5 ....8.30
Houston S5 ....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 ....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 ....9.00
Pittsburgh J5 ....8.30
Seattle B3 ....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Sterling,Ill. N15 ....7.925
Struthers,O. Y1 ....8.30
Youngstown U5 ....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 ....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 ....5.775
Sterling,Ill.(1) N15 ....5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ....5.675
Atlanta A11 ....5.875
Joliet,Ill. P22 ....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 ....6.375
Pittsburgh J5 ....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 ....6.52
Seattle B3 ....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Economy,Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 ....6.80
Youngstown U5 ....6.80

BARS, C.F. Leaded (Including leaded extra) Carbon
LosAngeles P2, S30 ...11.75*

Alloy
Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12 ..10.175
Camden,N.J. P13 ....10.35
Chicago W18 ....10.175
Elyria,O. W8 ....10.175
Monaca,Pa. S17 ....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2.7.65
Birmingham C15 ....8.25
Buffalo B5 ....7.70
Camden,N.J. P13 ....8.10
Carnegie,Pa. C12 ....7.65
Chicago W18 ....7.65
Cleveland A7, C20 ....7.65
Detroit B5, P17 ....7.85
Detroit S41 ....7.65
Donora,Pa. A7 ....7.65
Elyria,O. W8 ....7.65
FranklinPark,Ill. N5 ..7.65
Gary,Ind. R2 ....7.65
GreenBay,Wis. F7 ....7.65
Hammond,Ind. J5, L2 ..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 ....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 ....7.65
Monaca,Pa. S17 ....7.65
Newark,N.J. W18 ....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 ....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
Seattle(49) S30 ....9.10
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 ....7.65
Warren,O. C17 ....7.65
Waukegan,Ill. A7 ....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19.6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa.M12,R2 9.025
Bethlehem,Pa. B2 ....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 ....9.025
Camden,N.J. P13 ....9.20
Canton,O. T7 ....9.025
Carnegie,Pa. C12 ....9.025
Chicago W18 ....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 ....9.225
Detroit S41 ....9.025
Donora,Pa. A7 ....9.025
Elyria,O. W8 ....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 ....9.025
GreenBay,Wis. F7 ....9.025
Hammond,Ind. J5, L2 ..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 ....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ..9.025
Midland,Pa. C18 ....9.025
Monaca,Pa. S17 ....9.025
Newark,N.J. W18 ....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 ....9.20

Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.25
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex.(26) T4 ..5.50
Gary,Ind. U5 .....5.675
Houston S5 .....5.675
Ind.Harbor,Ind. I-2, Y1 5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.675
Kokomo,Ind. C16 ....5.775
Lackawanna,N.Y. B2..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ...6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.675
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. R2, W14 5.675
S Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Steelton,Pa. B2 .....5.675
Sterling,Ill.(1) N15 ...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ..6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.35
Johnstown,Pa. B2 ....7.33
KansasCity,Mo. S5 ....7.35
Lackawanna,N.Y. B2 ..7.35
Marion,O P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ...7.35
Seattle A24, B3, N14 ..7.95
SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ..7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.)L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ....5.575
Franklin,Pa.(4) F5 ....5.675
JerseyShore,Pa.(3) J8 .5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ...5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ...5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 ....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	...7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	....7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	..7.225	7.475
Irvin,Pa. U5	....7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	.7.975	....
Pittsburgh J5	....7.225	....
SparrowsPt. B2	..7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ...7.475

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Longe Terne, Steel

Follansbee,W.Va. W10 .7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 ....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National-Standard Co.
N2 National Supply, Armco Steel Corp.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope, Armco Steel Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Uibrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1..5.10
Johnstown,Pa.(25) B2..5.10
Lackaw'na,N.Y.(25) B2.5.10
LosAngeles(25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. W14 ....5.10
S.SanFrancisco(25) B3..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor,Ind. Y1 ....8.40
KansasCity,Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 ....8.40
S.Chicago,Ill. W14 ....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 .....7.575
Bessemer,Ala. T2 .....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2, Y1 7.575
Lackawanna,N.Y. B2..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 ....7.575
S.SanFrancisco(25) B3.8.325
SparrowsPoint,Md. B2 .7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ...7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ...5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7, J5 .....7.425
Dearborn,Mich. S3 ....7.425
Detroit D2, M1, P20 ..7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 ....7.525
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. W10 .7.425
Fontana,Calif. K1 .....9.20
FranklinPark,Ill. T6 ..7.525
Ind.Harbor,Ind. Y1 ....7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport,Pa. E10 ...7.525
NewBedford,Mass. R10.7.875
NewBritain,Conn. S15 ..7.875
NewCastle,Pa. B4, M23 7.425
NewHaven,Conn. D2 ...7.875
NewKensington,Pa. A6.7.425
Pawtucket,R.I. R3, N8.7.975
Philadelphia P24 .....7.875
Pittsburgh J5 .....7.425
Riverdale,Ill. A1 .....7.525
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J.(31) R5 ..8.875
Warren,O. R2, T5 ....7.425
Worcester,Mass. A7 ...7.975

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Cleveland A7 .....15.55
Carnegie,Pa. S18 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. S18 ....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. N8 ....15.90
Riverdale,Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ..15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ....10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ....10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80
Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson,Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	...	18.85	22.95	27.80
Buffalo W12	...	...	18.85	....	....
Fostoria,O. S1	...	...	19.05	22.15	....
FranklinPark,Ill. T6	...	...	19.20	23.30	28.15
Harrison,N.J. C18	...	...	18.85	22.95	27.80
NewYork W3	...	...	18.85	22.95	27.80
Palmer,Mass. W12	...	...	18.85	....	....
Trenton,N.J. R5	...	...	18.85	22.95	27.80
Worcester,Mass. A7, T6	...	...	18.85	22.95	27.80
Youngstown S41	...	...	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ....7.525*
McKeesport,Pa. E10 ...7.50*
NewCastle,Pa. M23 ..7.425*
Riverdale,Ill. A1 ....7.525*
Warren,O. B9, S3, T5.7.425*
Worcester,Mass. A7 ..7.975
Youngstown S41, Y1 .7.425*

*Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.85
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

ELECTROLYTIC THIN TIN PLATE (¼ lb coating in coils)

	Base Box			
	45 lb	50 lb	55 lb	60 lb
Fairfield,Ala. T2	$6.20	$6.35	$6.50	$6.65
Fairless,Pa. U5	6.20	6.35	6.50	6.65
Gary,Ind. U5	6.10	6.25	6.40	6.55
Irvin,Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint,Md. B2	6.10	6.25	6.40	6.55
Weirton,W.Va. W6	6.10	6.25	6.40	6.55

TIN PLATE, Hot Dipped Common Coke	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$8.20
Fairfield,Ala. T2 .....8.30
Fairless,Pa. U5 .....8.30
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.20
GraniteCity,Ill. G4 ....8.30
Ind.Harbor,Ind. Y1, I-2, Y1.8.20
Irvin,Pa. U5 .....8.20
Niles,O. R2 .....8.20
Pittsburg,Calif. C11 ....8.85
SparrowsPoint,Md. B2 ..8.20
Weirton,W.Va. W6 ....8.20
Yorkville,O. W10 .....8.20

HOLLOWARE ENAMELING (Black Plate) (29 Gage)

Aliquippa,Pa. J5 .....7.85
Gary,Ind. U5 .....7.85
GraniteCity,Ill. G4 ....7.95
Ind.Harbor,Ind. Y1 ....7.85
Irvin,Pa. U5 .....7.85
Yorkville,O. W10 .....7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Mansfield,O. E6	8.10
Vandergrift,Pa. U5	8.10
Warren,O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	....	19.70	20.20	20.70 ....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coil, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 ....8.00
Crawfordsville,Ind. M8..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O.(24) S1 ....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ...8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 ....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ...8.25
Monessen,Pa. P7, P16..8.00
Palmer,Mass. W12 .....8.30
Pittsburg,Calif. C11 ....8.95
Portsmouth,O. P12 .....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2...8.10
Sterling,Ill.(1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 ....13.40
KansasCity,Mo. U3 ...12.90
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ...12.95
Palmer,Mass. W12 ....13.70
Pittsburg,Calif. C11 ...13.45
Portsmouth,O. P12 ....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt.,Md. B2 ...13.50
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
Kokomo,Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16...9.75
NewHaven,Conn. A7 ...10.05
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ....10.70
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ...10.70
SparrowsPt.,Md. B2 ...9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7 ...10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville,Ill. K4 .....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 ....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.70
Milbury,Mass.(12) N6 .10.05
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ....10.70
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ...10.70
SparrowsPt.,Md. B2 ...9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Wor'ster,Mass.A7,J4,T6 10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....16.50
Bartonville,Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville,Ind. M8.16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ..16.65
Johnstown,Pa. B2 ....16.30
KansasCity,Mo. S5 ....16.55
Kokomo,Ind. C16 .....16.30
Minnequa,Colo. C16 ....16.55
Monessen,Pa. P16 .....16.30
Muncie,Ind. I-7 .....16.50
Palmer,Mass. W12 ....16.60
S.SanFrancisco C10 ...17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7, J6.16.60

ROPE WIRE (A)

Bartonville,Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria,O. S1 .....13.45
Johnstown,Pa. B2 .....13.45
Monessen,Pa. P7 .....13.45
Muncie,Ind. I-7 .....13.65
Palmer,Mass. W12 ....13.75
Portsmouth,O. P12 ....13.45
Roebling,N.J. R5 .....13.75
St.Louis L8 .....13.45
SparrowsPt.,Md. B2 ...13.55
Struthers,O. Y1 .....13.45
Worcester,Mass. J4 ...13.75
(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

	Col.
Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

	Col.
Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Evanston,Ill. M22	12.45
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
NewCastle,Pa. M23	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock Sizes

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, CUT (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	10.51
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	8.88
LosAngeles B3	9.44
Minnequa,Colo. C10	9.02
Pittsburg,Calif. C11	9.44
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	10.85
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.16
LosAngeles B3	9.75
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.75
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt. Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	10.90
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	10.96
Kokomo,Ind. C16	9.21
LosAngeles B3	9.80
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.80
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	.193••
Aliquippa,Pa. J5	190§
Atlanta A11	197•
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198••
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198••
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198••
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193••
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40••
All'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Chicago W13	17.85	....
Cleveland A7	17.85	....
Craw'sville M8	17.95	19.80††
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65••
Jacksonville M8	18.95	19.80††
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65••
P'lm'r,Mass W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75••
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WOVEN FENCE, 9-15 Ga. Col.

Ala.City, Ala. R2	.187••
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	191•
Bartonvill,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192••
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192••
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192••
Pittsburg,Calif. C11	210†
Rankin,Pa. A1	187†
S.Chicago,Ill. R2	187••
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Ala.City,Ala. R2	.9.00 9.55••
Aliquippa J5	8.65 9.325§
Atlanta (48) A11	.9.00 9.75•
Bartonville(48)K4	9.85 19.90
Buffalo W12	.9.00 9.55†
Chicago W13	.9.00 9.55••
Cleveland A7	.9.00 ....
Crawfordsville M8	9.10 9.80††
Donora,Pa. A7	.9.00 9.55†
Duluth A7	.9.00 9.55†
Fairfield T2	.9.00 9.55†
Houston(48) S5	.9.25 9.80••
Jack'ville,Fla. M8	9.10 9.80‡‡
Johnstown(48) B2	9.00 9.675§
Joliet,Ill. A7	.9.00 9.55†
KansasCity(48)S5	9.25 9.80••
Kokomo(48) S16	.9.10 9.65†
LosAngeles B3	.9.95 10.625§
Minnequa C10	.9.25 9.80••
Monessen(48) P7	8.65 9.35§
Palmer,Mass. W12	9.30 9.85†
Pitts.,Calif. C11	.9.95 10.50†
Rankin,Pa. A7	.9.00 9.55†
S.Chicago R2	.9.00 9.55••
S.SanFran. C10	.9.95 10.50••
Spar'wsPt.(48)B2	9.10 9.775§
St'ling(37)(48)N15	9.10 9.80
Struthers,O. Y1	.9.00 9.65‡
Worcester,Mass.A7	9.30 9.85†

Based on zinc prices of: •13.50c. †5c. ‡10c. §Less than 10c. ††10.50c. ‡‡11.00c. ••Subject to zinc equalization extras.

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85 7/16 in. and smaller by 6 in. and shorter: 15% off list.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nut 1⅛ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
•Bulk	50

•Hot galvanized or zinc plated lag bolts only — for package or bulk quantities use aplicable list less bulk discounts.

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packaged	+55
Bulk	+16

Flat Head Cap Screws: ¾ in. and smaller, 6 in. and shorter:

Packaged	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter:	
Packaged	+ 5
Bulk	19
Through 1 in. diam., longer than 6 in.:	
Packaged	+29

HEXAGON NUTS: American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.: Plain Finish 50

Hot Galvanized and Zinc Plated:

Packaged	43.75
Bulk	50

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.00	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St.Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2¾	12	54.23	63.57	48.13
2⅞	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.625

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(12) Worcester, Mass., base.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.65c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 22 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 2½ in. and smaller hexagons; 9.65c for larger rounds and hexagons and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 12.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	52.00
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	59.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	80.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	65.50
330	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.35	43.40

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates: Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham R2	$2.00	$2.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala., W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	...	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y., R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca, Pa., deld	....	68.33	68.33	68.83
Lawrenceville, W. Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....

Other U. S. Districts	Basic	No. 2 Foundry	Malleable	Bessemer
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
Port Colborne, Ont. A25	65.00	65.00	65.50	66.00
Sault Ste. Marie, Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Buffalo H1	$79.25
Jackson, Ohio I-3, J1	78.00
Port Colborne, Ont. A25	78.50

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items (except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb, except in Chicago, New York, Boston, Los Angeles, and San Francisco, 10,000 lb. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS				STRIP	BARS				PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	STRUCTURAL SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	....	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	7.77	8.66	10.06	....	8.28	8.55	11.70	16.38	9.03	8.34	10.02
Birmingham	9.43	10.20	10.46	....	10.41	8.26	13.14	16.76	8.47	8.41	10.05
Boston	9.67	10.58	11.77	53.50	12.16	9.77	13.35	16.59	10.16	9.62	11.08
Buffalo	8.65	9.80	11.25	55.98	11.00	8.75	11.45	16.30	9.15	8.65	11.10
Charlotte, N. C.	9.87	11.22	10.30	....	10.86	9.67	12.68	....	9.88	9.82	11.46
Chicago	9.22	10.20	10.70	52.00	11.39	9.22	10.65	15.95	9.57	9.06	11.35
Cincinnati	8.74	10.26	10.20	65.30	11.06	8.87	11.53	16.27	9.47	8.79	11.01
Cleveland	8.57	9.88	11.24	56.18	10.86	8.66	11.25	16.06	9.30	8.65	10.92
Dallas	9.62	10.05	12.59	....	11.18	9.03	12.98	16.95	9.26	9.35	11.00
Detroit	9.48	10.46	11.05	52.00	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	9.22	9.65	12.19	52.00	10.78	8.63	13.10	16.55	8.86	8.95	10.60
Indianapolis	9.66	10.64	11.14	....	11.83	9.66	11.09	16.39	10.01	9.50	11.79
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	8.95	11.20	11.45	61.27	10.65	9.00	14.20	17.35	9.90	8.40	11.15
Memphis, Tenn.	8.98	10.05	....	....	10.64	8.82	12.74	....	9.01	8.66	11.41
Milwaukee	9.36	10.34	10.84	....	11.53	9.36	10.89	16.09	9.79	9.20	11.49
Moline, Ill.	8.92	10.55	10.50	....	10.90	8.90	11.00	16.30	9.26	8.76	10.96
Newark, N. J.	9.36	10.13	11.35	....	11.46	9.74	13.25	16.40	10.20	9.51	11.05
New York	9.36	10.13	11.35	52.98	11.46	9.74	13.25	16.40	10.20	9.51	11.05
Philadelphia	8.35	9.60	10.66	52.71	10.35	8.75	11.95	16.38	8.95	8.70	9.95
Pittsburgh	8.57	9.88	11.13	52.00	10.84	8.55	11.25	15.95	8.91	8.41	10.68
Portland, Oreg.	9.45	11.30	12.35	....	11.45	9.45	16.65	17.80	10.05	9.60	11.75
St. Louis	9.42	10.58	11.08	....	11.59	9.44	11.28	16.33	9.80	9.28	11.59
St. Paul	8.84	9.59	10.84	....	11.01	8.82	11.49	16.54	9.18	8.68	10.44
San Francisco	10.17	11.69	11.40	54.00	11.78	10.07	15.10	17.25	10.49	10.38	12.47
Seattle	10.51	11.57	12.50	54.02	11.95	9.94	16.20	17.80	10.65	10.10	12.73
Spokane, Wash.	10.36	11.42	12.35	54.02	11.80	9.79	16.20	17.80	10.50	9.95	12.58

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; stainless, 16 Ga. & 36 in.; hot rolled strip, ⅜ in. x 1 in.; hot rolled carbon bars, rounds, ⅝ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, sheared, through ½ in. x 84 in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $146; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Vandalia, Mo., New Salisbury, Ohio, $97; Vanport, Pa., Wellsville, Irondale, Ohio, $100; Clearfield, Pa., Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $250; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ⅛ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore (periclase), $73; Pascagoula, Miss. (periclase), $90.

*—9 in. x 4½ x 2.50 straights.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:

Carbon (N.T.):
- Forging $97.00
- Rerolling 78.00

Alloy (N.T.) 115.00

Wire Rods:
- Carbon 5.70
- Alloy 6.40

Wire (carload lots):
- Merchant annealed . 8.40
- Low carbon indus. . 7.20
- Upholstery spring .. 8.55
- M.B. spring 8.85

Bars & Small Shapes:
- Carbon, merchant .. 5.30
- Carbon, special 5.85
- Alloy 6.40

Bar Mill Bands:
- Carbon 5.40
- Alloy 8.05

Bars, Reinforcing 5.30

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron, Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe.	36.75, ton, del. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh) ..	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 600-lb drum freight allowed, c.l.	39.80; ton lots 41.80
Brass, 80/20, leaded (60 mesh)	37.50
Bronze powder, 90/10.	55.10
Copper, all types	15.25*
Lead	7.50*
Manganese, minus 35 mesh	1.00
Nickel, all types ..	0.78-1.06
Nickel-Silver	58.70
Solder	7.50*
Stainless Steel, 304 ..	89.00
Stainless Steel, 316 ..	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	24.20

Cobalt:	Dollars
98.5%, minus 100-300 mesh ..	1.57-1.58
99.5%, below 5 microns	2.32
Tungsten	nom.
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes*	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305 ...	$5.62	....	$5.52	$5.37	$5.72
Bar Size Angles	5.75	....	5.65	5.50	5.85
Structural Angles	5.65	....	5.55	5.40	5.75
I-Beams	5.65	....	5.55	5.40	5.75
Channels	5.65	....	5.55	5.40	5.75
Plates (basic bessemer)	5.70	....	5.60	5.45	5.80
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.20	....	24.40	24.40	25.20
Barbed Wire (†)	6.50	....	6.40	6.25	6.60
Merchant Bars	5.75	....	5.65	5.50	5.85
Hot-Rolled Bands	5.85	....	5.75	5.60	5.95
Wire Rods, Thomas Commercial No. 5	5.80	....	5.75	5.75	6.00
Wire Rods, O.H., No. 5	6.00	....	5.95	5.95	6.25
Bright Common Wire Nails (§)	6.85	....	6.75	6.60	6.95

*Book closed for 1960-61 shipping season. †Per 82 lb net reel. §Per 100-lb keg, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective for the 1960 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Lump ½ in. and up	12.85
Fines, under ½ in.	10.72
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1960; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	*25.00†*
Chilean, 62-65%, c.i.f. Atlantic ports ..	22.00
Brazillian, 68.5% f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	*$19.00-19.50**
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-58%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charlestown, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.75
48% no ratio	24.00-26.00†

Turkish

48% 3:1	*35.00-37.00†*

Domestic

Rail nearest seller

48% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
55-60%	*$2.70-3.20*
60-65%	*3.25-3.45*

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

*Before duty. †Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	37.00
Pontiac, Mich., deld.	34.05
Saginaw, Mich., deld.	35.63
Erie, Pa., ovens	32.00
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.64
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens.	30.75
New Haven, Conn., ovens	31.00
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.45
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.78
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade	14.75

Per ton bulk, f.o.b. cars or trucks, plant.

Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa. 21-23% Mn, $102.50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn $98. For Neville Island, Pa., prices add $2.50 as of Feb. 1. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Min 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%. fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6e per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.3c from above prices. For 3% grade, Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75e per lb of contained Cr. Delivered.

Charge Chrome: Cr 50-56%, C 6-8%, Si 4-7%, 22.00c; Cr 58-63%, C 5.8%, Si 3-6%, 22.50c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 53-63%, C 3-5%, Si 2.5% max, 26.00c per lb of contained Cr, delivered in carlots, lump, bulk.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 33.50c per lb contained Cr; 0.010% max, 34.50c. Delivered.

Cr, 65-71%, carload, lump, bulk, 0.025% max, 35.00c; 0.05% max, 34.00c; 0.10% max, 33.75c; 0.20% max, 33.50c; 0.50% max, 33.25c; 1.0% max, 33.00c; 1.5% max, 32.75c; 2.0% max, 32.50c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 33.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload, bulk, 20.05c per lb of alloy carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 24.50c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 24.50c per lb contained Cr, 14.60c per lb contained Si; 0.75 in. x down, 26.25c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot packed, 2" x D plate (above ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lots, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). $5.25 per lb (all quantities) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-77% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20% per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

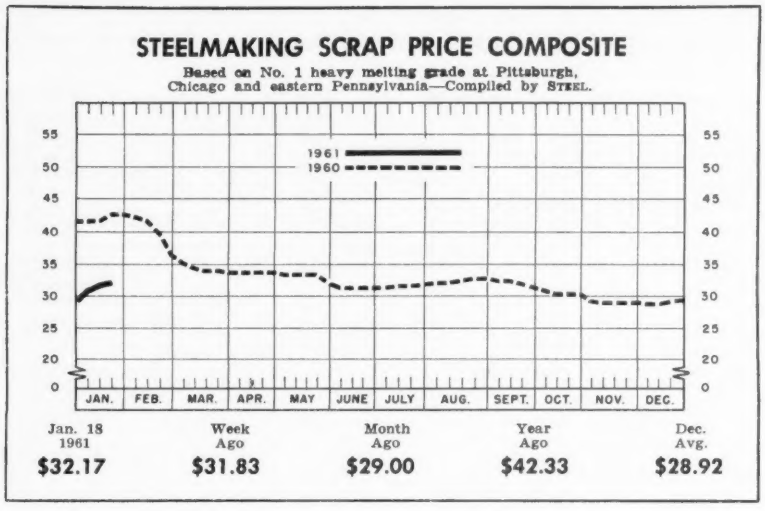
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.



Scrap Loses Some of Its Punch

STEEL's composite on No. 1 heavy melting rises 34 cents to $32.17, but market fails to sustain recently developed strength. Chief support still coming from exports

Scrap Prices, Page 86

• **Philadelphia** — Domestic prices are higher on several grades, due to light supply and a flow of small orders. Scarcity of material is attributed to steady export demand, combined with bad weather. No. 1 heavy melting is higher at $36, and No. 2 heavy melting is quoted at $32, both grades up $1. No. 2 bundles are up $2 to $23. Low phos structurals and plates are holding at $38-$41, and rail crops (2 ft and under), are up $1 to $47-$49. Drop broken machinery ($48-$49) is up $1.

• **New York**—Except for an advance of $1 on No. 2 bundles to $16-$17, brokers' buying prices are unchanged. Export demand continues to provide market support. A strike of railroad tug operators didn't affect scrap shipments—they usually move in private scows that are powered by private tugs.

• **Chicago**—The market has lost some of its steam, but prices are unchanged. Mills have been out of the market for several days. District steelmaking has become more or less stationary after recovering from the holiday slump, and is causing the postponement of some expected January orders.

• **Pittsburgh** — Brokers' bids on Pennsylvania Railroad scrap went up about $3 a ton on the strength of export demand. Specialties brought as much as $42.90, and some of the material apparently went to local consumers. On a later sale, Pittsburgh & Lake Erie Railroad sold No. 1 railroad heavy melting for $35, about $4.75 a ton less than the Pennsylvania got. Brokers have been offering dealers $23 a ton for No. 2 heavy melting scrap, delivered to a mill in a trade for tube ends.

• **Cleveland**—Resumption of widespread mill buying has not followed in the wake of the recent sharp advance in prices, and the market has lost some of its push. One reason: A Valley steelmaker has blown in three idle blast furnaces, which means hot metal will continue to give scrap stiff competition. Recent sales of railroad material went at prices $3 to $5 a ton over the December lists, particularly railroad specialties.

• **Detroit**—The market continues sluggish. There are no orders currently outstanding, and dealers seem to be more pessimistic than usual. There's some talk of a decrease in price when auto lists close at the end of the month, but, generally, it's thought there'll be little change.

• **Buffalo** — Prices have advanced again in this market, chiefly on the basis of export demand, though gradual improvement in steel mill operations is also a factor for strength. District mills have done relatively little buying at the recently established higher price levels, but trade sources anticipate active buying next month. On the basis of export and brokers' buying prices, the consumer price for No. 1 heavy melting steel here is now quoted at $27-$28. Secondary mill grades and blast furnace scrap have joined the advance.

• **Cincinnati**—Scrap is moving better as the market digests the recent round of price increases. No. 1 heavy melting is quoted $24.50-$25.50 by brokers. A $1 a ton hike has raised the price of No. 1 bundles to $25.50-$26.50.

• **St. Louis**—The market is firmer. Prices are inching upward in a few categories. Rails (18 in. and under) moved up $2 to $43. Angles and splice bars are quoted $3 higher at $40, and clean auto cast is quoted $2 higher at $41. No. 1 machinery cast also advanced $2 to $41. Some brokers are predicting noticeable improvement in prices within 60 days.

• **Birmingham**—The market appears to be stronger. Demand for electric furnace material is increasing and requirements on export account, principally for Japan, are reported rising. Last week, one area steelmaker purchased heavy melting steel at $30-$31, but dealers are quoting $29-$30 as more representative of the market. Bar crops and plates are up $1 to $37. Structurals and plates are also up $1 to $36-$37. No. 1 bundles are still quoted $33-$34. Dealers expect higher prices next month.

• **Houston**—The price on No. 1 bundles has edged up slightly to $34, but demand is light. Other steel scrap prices in this area are unchanged. Foundries are making

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Jan. 18, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Jan. 18	$32.17
Jan. 11	31.83
Dec. Avg.	28.92
Jan. 1960	41.92
Jan. 1956	52.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	24.00-25.00
No. 1 dealer bundles	29.00-30.00
No. 2 bundles	23.00-24.00
No. 1 busheling	29.00-30.00
No. 1 factory bundles	*36.00-37.00*
Machine shop turnings	11.00-12.00
Mixed borings, turnings	11.00-12.00
Short turnings	15.00-16.00
Cast iron borings	15.00-16.00
Cut structurals:	
2 ft and under	*33.00-34.00*
3 ft and under	*32.00-33.00*
Heavy turnings	*25.00-26.00*
Punchings & plate scrap	*36.00-37.00*
Electric furnace bundles	36.00-37.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	31.00-32.00
Stove plate	27.00-28.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	31.00-32.00
Drop broken machinery	44.00-45.00‡

Railroad Scrap

No. 1 R.R. heavy melt.	*35.00-36.00*
Rails, 2 ft and under	47.00-48.00
Rails, 18 in. and under	48.00-49.00
Random rails	*41.00-42.00*
Angles, splice bars	37.00-38.00
Railroad specialties	*42.00-43.00*
Rails, rerolling	53.00-54.00

Stainless Steel Scrap

18-8 bundles & solids	175.00-180.00
18-8 turnings	95.00-100.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	*30.00-32.00*
No. 1 hvy melt., dealer	29.00-30.00
No. 2 hvy melting	*26.00-27.00*
No. 1 factory bundles	*34.00-35.00*
No. 1 dealer bundles	*29.00-30.00*
No. 2 bundles	19.00-20.00
No. 1 busheling, indus.	*30.00-32.00*
No. 1 busheling, dealer	29.00-30.00
Machine shop turnings	14.00-15.00
Mixed borings, turnings	16.00-17.00
Shovel turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut structurals, 3 ft	33.00-34.00
Punchings & plate scrap	35.00-36.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Stove plate	33.00-34.00
Unstripped motor blocks	31.00-32.00
Clean auto cast	44.00-45.00
Drop broken machinery	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	*30.00-32.00*
R.R. malleable	43.00-44.00
Rails, 2 ft and under	45.00-46.00
Rails, 18 in. and under	46.00-47.00
Angles, splice bars	40.00-41.00
Axles	*53.00-55.00*
Rails, rerolling	54.00-55.00

Stainless Steel Scrap

18-8 bundles, solids	*165.00-175.00*
18-8 turnings	90.00-95.00
430 bundles & solids	85.00-90.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	20.00-21.00
No. 2 heavy melting	15.00-16.00
No. 1 bundles	22.00-23.00
No. 2 bundles	12.00-13.00
No. 1 busheling	19.00-20.00
Machine shop turnings	6.00-7.00
Mixed borings, turnings	*7.00-8.00*
Shovel turnings	*8.00-9.00*

Cast Iron Grades

No. 1 cupola	29.00-30.00
Stove plate	23.00-24.00
Heavy breakable	22.00-23.00
Unstripped motor blocks	18.00-19.00
Charging box cast	24.00-25.00
Clean auto cast	35.00-36.00

CLEVELAND

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	19.00-20.00†
No. 1 factory bundles	34.00-35.00
No. 1 bundles	*28.50-29.50*
No. 2 bundles	16.00-17.00
No. 1 busheling	29.00-30.00
Machine shop turnings	10.00-11.00
Shovel turnings	14.00-15.00
Mixed borings, turnings	14.00-15.00
Cast iron borings	14.00-15.00
Cut foundry steel	31.00-32.00
Cut structurals, plate 2 ft and under	36.00-37.00
Low phos. punchings & plate	28.00-29.00
Alloy free, short shovel turnings	14.00-15.00
Electric furnace bundles	28.00-29.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Charging box cast	24.00-25.00
Heavy breakable cast	26.00-27.00
Stove plate	34.00-35.00
Unstripped motor blocks	29.00-30.00
Brake shoes	35.00-36.00
Clean auto cast	43.00-44.00
Burnt cast	30.00-31.00
Drop broken machinery	44.00-45.00

Railroad Scrap

R.R. malleable	42.00-43.00
Rails, 2 ft and under	45.00-46.00
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	38.00-39.00
Cast steel	38.00-39.00
No. 1 railroad cast	42.00-43.00
Railroad specialties	42.50-43.50
Angles, splice bars	40.50-41.50
Rails, rerolling	53.00-54.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	150.00-155.00
18-8 turnings	65.00-70.00
430 clips, bundles, solids	65.00-70.00
430 turnings	10.00-20.00

YOUNGSTOWN

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	21.00-22.00
No. 1 busheling	32.00-33.00
No. 1 bundles	32.00-33.00
No. 2 bundles	20.00-21.00
Machine shop turnings	12.00-13.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Low phos.	33.00-34.00
Electric furnace bundles	33.00-34.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00

BUFFALO

No. 1 heavy melting	*27.00-28.00*
No. 2 heavy melting	*23.00-24.00*
No. 1 bundles	*27.00-28.00*
No. 2 bundles	*20.00-21.00*
No. 1 busheling	*27.00-28.00*
Shovel turnings	*16.00-17.00*
Machine shop turnings	*12.00-13.00*
Cast iron borings	*14.00-15.00*
Low phos. structurals and plates, 2 ft and under	*37.00-38.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	36.00-37.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths	*40.00-41.00*
Rails, 3 ft and under	*46.00-47.00*
Rails, rerolling	*54.00-55.00*
Railroad specialties	*39.00-40.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	24.50-25.50
No. 2 heavy melting	*22.50-23.50*
No. 1 bundles	*25.50-26.50*
No. 2 bundles	17.00-18.00
No. 1 busheling	24.50-25.50
Machine shop turnings	10.00-11.00
Mixed borings, turnings	*11.00-12.00*
Shovel turnings	11.00-12.00
Cast iron borings	11.00-12.00
Low phos. 18 in.	33.00-34.00

Cast Iron Grades

No. 1 cupola	35.00-36.00
Heavy breakable cast	28.00-29.00
Charging box cast	35.00-36.00
Drop broken machinery	*46.00-47.00*

Railroad Scrap

No. 1 R.R. heavy melt.	29.00-30.00
Rails, 18 in. and under	44.00-45.00
Rails, random lengths	*37.00-38.00*

PHILADELPHIA

No. 1 heavy melting	*36.00*
No. 2 heavy melting	*32.00*
No. 1 bundles	38.00
No. 2 bundles	*23.00*
No. 1 busheling	37.00
Electric furnace bundles	38.00
Mixed borings, turnings	14.00†
Shovel turnings	18.00†
Machine shop turnings	13.00†
Heavy turnings	25.00†
Structurals & plates	*38.00-41.00*
Couplers, springs, wheels	39.00-40.00
Rail crops, 2 ft & under	*47.00-49.00*

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	39.00
Drop broken machinery	*48.00-49.00*
Malleable	46.00†

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	19.00-20.00
No. 1 bundles	27.00-28.00
No. 2 bundles	*16.00-17.00*
Machine shop turnings	3.50-4.00†
Mixed borings, turnings	4.00-4.50†
Shovel turnings	5.00-6.00†
Low phos. structurals & plates	31.00-32.00†

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	23.00-24.00
Heavy breakable	28.00-29.00

Stainless Steel

18-8 sheets, clips, solids	140.00-145.00
18-8 borings, turnings	70.00-75.00†
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	50.00-55.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	23.00-24.00
No. 2 heavy melting	19.00-20.00
No. 1 bundles	23.00-24.00
No. 1 busheling	23.00-24.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	30.00-30.50
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	33.00-34.00
No. 2 bundles	20.00-21.00
No. 1 busheling	33.00-34.00
Cast iron borings	10.00-11.00
Machine shop turnings	15.00-16.00
Shovel turnings	18.00-19.00
Bar crops and plate	*36.00-37.00*
Structurals & plate	*36.00-37.00*
Electric furnace bundles	34.00-35.00
Electric furnace:	
3 ft and under	34.00-35.00
2 ft and under	36.00-37.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	45.00-46.00
Unstripped motor blocks	33.00-34.00
No. 1 wheels	34.00-35.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	37.00-38.00
Angles, splice bars	36.00-37.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	27.00
No. 2 heavy melting	25.00
No. 1 bundles	28.00
No. 2 bundles	19.00
No. 1 busheling	28.00
Machine shop turnings	8.00
Shovel turnings	10.00

Cast Iron Grades

No. 1 cupola	36.00
Charging box cast	33.00
Heavy breakable cast	31.00
Unstripped motor blocks	33.00
Clean auto cast	*41.00*
Stove plate	35.00

Railroad Scrap

No. 1 R.R. heavy melt.	31.00
Rails, random lengths	37.00
Rails, rerolling	49.00
Rails, 18 in. and under	*43.00*
Angles, splice bars	*40.00*

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	29.00
No. 1 bundles	*34.00*
No. 2 bundles	18.00-19.00
Machine shop turnings	7.00-8.00†
Low phos. plate & structurals:	
3 ft	34.00
2 ft and under	36.00-37.00

Cast Iron Grades

No. 1 cupola	33.00-33.50
Heavy breakable	24.00
Foundry malleable	29.00-30.00†
Unstripped motor blocks	27.00-27.50

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00

LOS ANGELES

No. 1 heavy melting	30.00
No. 1 hvy melt (export)	*34.00-35.00*
No. 2 heavy melting	26.00
No. 2 hvy melt (export)	*30.00-31.00*
No. 1 bundles	25.00
No. 2 bundles	17.00
No. 2 bundles (export)	*22.00-23.00*
Machine shop turnings	12.00
Shovel turnings	12.00
Cast iron borings	12.00
Cut structurals and plate 1 ft and under	41.00

Cast Iron Grades

No. 1 cupola	40.00-41.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-36.00

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	36.00
No. 2 heavy melting	34.00
No. 2 bundles	19.00
Shovel turnings	13.00
Electric furnace bundles	46.00

Cast Iron Grades

No. 1 cupola	31.50
Heavy breakable	31.00
Unstripped motor blocks	31.00
Stove plate (f.o.b. plant)	18.00

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	36.00
No. 1 (prepared for shears)	33.00
No. 1 hvy (unprepared)	33.00
No. 2 heavy melting	34.00
No. 2 hvy (unprepared)	30.00
No. 2 bundles	20.00
Shovel turnings	15.00
Electric furnace bundles	46.00

Cast Iron Grades

No. 1 cupola	31.50
Heavy breakable cast	33.00
Unstripped motor blocks	30.00
Stove plate (f.o.b. plant)	20.00

SAN FRANCISCO

No. 1 heavy melting	32.00
No. 2 heavy melting	29.00
No. 1 bundles	27.00-28.00
No. 2 bundles	18.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Cast iron borings	14.00
Heavy turnings	14.00
Shovel turnings	14.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	46.00-48.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

No. 1 heavy melting	24.00
No. 2 hvy melt, 2 ft & under	22.50
No. 1 bundles	24.00
No. 2 bundles	17.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Busheling, new factory: Prepared	23.00
Unprepared	18.00
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	30.00

†Nominal.
‡F.o.b. Hamilton, Ont.
§Delivered.

no dents in scrapyard stocks. Exports remain the price-stabilizing factor in the Gulf Coast area. The intake of scrap by yards has lessened this month, largely because of bad weather.

• **San Francisco**—Exports to Japan continue to prop the steel scrap market here. Japan is believed to have produced more than 22 million tons of raw steel in 1960, about 5 millions more than in 1959. About 600,000 tons of 1960 output were shipped into the U. S. in the form of finished products. That, however, was said to be about 60,000 tons under the 1959 total.

• **Seattle**—The market is firmer and more scrap is moving. Local mills are buying in larger volume, while exports are providing substantial support. Prices are unchanged and are expected to hold through this month.

• **Portland, Oreg.**—Increased activity is reported in the scrap market here, but prices are unchanged and are expected to hold until next month. Exporters are busy. Tonnage is being assembled for shipment to Japan. At the same time, the local mill has resumed buying. Scrap supplies are ample. One shipbreaker moved a cargo of scrap to Japan this month and is preparing another 10,000 ton shipment.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 83

Coke production totaled 3,537,926 tons in November, 1960 (3,487,316 oven and 50,610 beehive), reports the U. S. Bureau of Mines. The total compares with 3,931,050 tons (3,879,436 oven and 51,614 beehive) in the preceding month and with 4,350,100 tons (4,284,000 oven and 66,100 beehive) in November, 1959.

Producers' stocks of oven coke at the end of November totaled 4,698,312 net tons, equal to 40.4 days' output. That compares with 5,157,985 tons, 35.3 days' output, at the end of November, 1959.

Production of coke in the first 11 months of 1960 totaled 53,564,965 net tons (52,666,631 oven and 898,334 beehive). That compares with 49,700,300 tons (48,718,400 oven and 981,900 beehive) in the same period of 1959. Coke breeze output in the first 11 months of the year was 3,404,036 tons vs. 3,378,900 in the same 1959 period.

Canadian Pig Iron Output Sets Record During 1960

Canadian production of pig iron was record breaking in 1960, but output of steel ingots fell below that of 1959.

Pig iron output totaled 4,279,205 tons, 87.7 per cent of rated capacity. It compared with 4,181,799 tons, 85.7 per cent, in 1959. December iron production was 295,420 tons vs. 333,411 in November.

Production of ingots totaled 5,686,416 tons, 84.6 per cent of rated capacity. Comparison: 5,817,012 tons, 86.5 per cent, in 1959. The slump in ingot output was due to a sharp break in December when production fell to 339,888 tons, lowest monthly rate for the year. Output in November was 444,225 tons.

Stocks of Iron Ore Gain Noticeably During 1960

Stocks of iron ore (U. S. and Canada) from all sources at the end of November, 1960, totaled 80,738,783 gross tons vs. 69,814,428 on the same date in 1959, reports the American Iron Ore Association. Of the total, 77,104, 734 tons were held in the U. S. vs. 66,870,542 at the end of November, 1959.

The inventory of Lake Superior ore (U. S.) at the end of the month was 49,295,834 tons vs. 35,354,829 the year before. Of the total, 46,418,846 tons were held in the U. S. vs. 33,860,435 the year before. Stocks of Canadian Lake Superior ore amounted to 2,452,507 tons, of which 2,318,397 tons were held in the U. S.

Pig Iron . . .

Pig Iron Prices, Page 82

Merchant pig iron is moving slowly, but a shade faster than in December when volume was curtailed by holiday suspensions at many foundries. Producers in the Buffalo area are concerned over the number of foundries going out of business in upstate New York. Recently, two fairly large foundries in Western New York announced plans to close permanently.

Youngstown Sheet & Tube Co. has put on a blast furnace at its Campbell (Ohio) Works and one at its Brier Hill Works, Youngstown.

Tool Steel . . .

Tool Steel Prices, Page 81

Shipments of tool steels (excluding hollow drill steel) in November, 1960, totaled 5709 net tons, reports the American Iron & Steel Institute. That compares with 5990 tons in October, 1960, and 8376 tons in November, 1959.

Movement in the first 11 months of last year was 81,087 net tons, down 5772 tons from the 86,859 tons moved in the same period of 1959.

Tin Plate . . .

Tin Plate Prices, Page 79

Inland Steel Corp. made a minor change in the price of wide, lightweight tin plate for can manufacture. The revision (said to be in line with changes made earlier by other producers) cuts 15 cents, or less than 2 per cent, from the price of 33½ to 36 in. width sheets of tin plate in base box weights of 65 to 75 lb. The move is thought to reflect increasing competition from aluminum for the can market. Inland will also charge an 80 cents extra for a new heavier coating on electrolytic tin plate.

Structural Shapes . . .

Structural Shape Prices, Page 77

While structural orders are slack, a substantial amount of work is reported to be on drawing boards. Fabricators anticipate expanding activity as the spring nears. Also, they look for greater diversity of construction.

Competition among fabricators continues sharp. Pittsburgh mills report January orders for shapes and plates were the largest since last May. The inquiry level is better, and fabricators' inventories appear pretty well depleted.

Since normal leadtimes are being ignored, it's hard for steelmen to predict how much business they'll receive over coming weeks. Right now, a spurt in demand from carbuilders isn't too likely, but other

(*Please turn to Page* 91)

Metalmen Want Price Stability

Nonferrous Metal Prices, Pages 90 & 91

THE FLOOD of price cuts that has battered the nonferrous market since early in the month has abated, at least temporarily. Metalmen hope current prices will hold, but the outlook is still too murky for them to have any real confidence, particularly in copper and zinc.

• **Copper Down**—Primary copper producers, living with a lackluster market that shows no signs of early improvement, cut their price by 1 cent to 29 cents a pound last Tuesday (Jan. 17). The move followed by six days an identical drop in custom smelter copper to 29 cents.

Behind the current troubles in copper are weak U. S. sales and world-wide overproduction. U. S. deliveries to fabricators fell to 91,163 tons in December, reports the Copper Institute, the lowest monthly total since last July. At the same time, refined production was up slightly to 152,211 tons. For the year, deliveries hit 1,279,745 tons, slightly under 1959's but better than 1958's and about on a par with 1957's. More significantly, refined production showed a whopping increase to 1,675,390 tons, a yearly record. U. S. crude production (primary and secondary) also set all-time highs. Over the year, producers' refined stocks more than doubled to 139,272 tons.

Despite Free World record deliveries of 3,606,766 tons to fabricators in 1960, demand can't soak up supply. Both Free World crude and refined production set records.

• **Why Copper Fell**—Sparking the drop in copper were weakening prices overseas due to excessive world supplies, plus intense competition in this country. With fabricators, particularly brass mills, struggling to meet competition from foreign firms, a 1 cent difference in the price they pay for copper becomes increasingly important to profits. Also, the brass mill subsidiaries of the primary producers weren't happy about paying 1 cent a pound more for their copper than other mills were paying to custom smelters. Thirdly, competition is so keen there were some fears that certain customers of producers might turn to the custom smelters for part of their needs.

Another cut in custom smelter copper is possible. Whether the producers would follow such a move and conceivably created a situation where first one price would sink, then the other, is a whispered worry inside the industry.

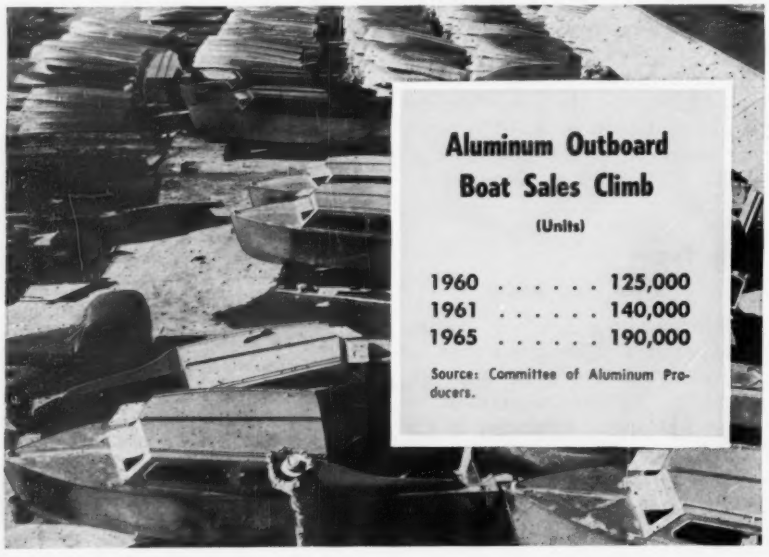
Most metalmen believe such a development, while possible, isn't likely.

On the plus side, don't be surprised to hear of some rather significant production curtailments at U. S. facilities soon.

• **Mill Prices Down More**—Brass and wire mill prices also dropped last week to reflect the lower copper prices, the second across-the-board cut within a week. Earlier, the mills had announced reductions because of lower prices for tin, lead, silicon, and especially zinc.

• **Quieter in Zinc**—The zinc industry is sweating out whether its latest price of 11.5 cents a pound (set on Jan. 9) will hold up. The pricing situation does appear a little brighter. St. Joseph Lead Co. has discontinued its policy of offering a 0.5 cent a pound discount under the *E&MJ* quoted average. The company had promised to end the "emergency measure" when "other domestic producers give tangible evidence of adopting market practices under which all consumers would be able to purchase zinc on a published price basis."

Lead sales are quiet but the price doesn't appear to be in jeopardy. Price cutting is still rampant in aluminum, and no letup is expected until demand picks up substantially.



In the Markets

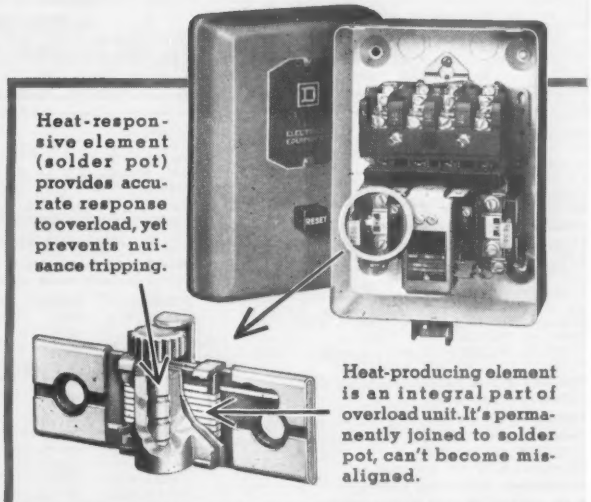
• **More Mag in Autos** — Use of magnesium by the auto industry will exceed 10 lb per car by 1965, forecasts Dow Chemical Co.

• **Platinum Metals Up** — Demand for platinum metals in 1960 may have set an all-time record, says Charles W. Engelhard, president and chairman of Engelhard Industries Inc., who sees a "definite long term uptrend" in industrial usage.

ONLY SQUARE D STARTERS WITH ONE-PIECE OVERLOAD RELAYS GIVE ABSOLUTE PROTECTION!

• Only Square D makes thermal overload relays with 1-piece construction—and only with 1-piece construction can you *know* you've installed the heater correctly. Square D 1-piece overload relays can be installed only one way. They are factory-assembled, individually tested and calibrated, completely tamper-proof. Repeated tripping will not affect accuracy.

You *pay* for overload protection—be sure you *get* it. Insist on Square D 1-piece overload relays for *absolute* protection.


Heat-responsive element (solder pot) provides accurate response to overload, yet prevents nuisance tripping.
Heat-producing element is an integral part of overload unit. It's permanently joined to solder pot, can't become misaligned.

EXCLUSIVE— 1-piece Overload Relay for *ABSOLUTE* Protection!

Mail coupon today for simple "jig-saw" demonstrator —see why only Square D gives absolute protection

Square D Company
Department SA-213
4041 North Richards Street
Milwaukee 12, Wisconsin

Please send me information on Square D magnetic starters, along with your simple 3-minute "jig-saw" demonstrator

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

SQUARE D COMPANY

wherever electricity is distributed and controlled

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 31.50; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.60 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55 per lb and up nom.

Copper: Electrolytic, 29.00 deld.; custom smelters, 29.00; lake, 29.00 deld.; fire refined, 28.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90; St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld.; 24-90 lb, $9.50; 100-499 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex, 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, N. York, $208-210 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports or entry, contained nickel, 65.50.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $3.50-5 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot, 100.875; prompt, 100.75.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max), $1.50 per lb.

Tungsten: owder, 98.8%, carbon reduced, 100-lb lots, $2.75-2.85 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.10-4.00.

Zinc: Prime western, 11.50; brass special, 11.75; intermediate, 12.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.85; special high grade, 13.00 deld. Die casting alloy ingot No. 3, 14.25; No. 2, 14.75; No. 5, 14.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8.8.50 per lb; 100-500 lb, $7.25-7.50 per lb, 500-1000 lb, $6.50-7.25; over 1000 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 25.00-26.00; No. 12 foundry alloy (No. 2 grade), 22.75; 5% silicon alloy, 0.60 Cu max., 24.00; 13 alloy, 0.60 Cu max., 24.00; 195 alloy, 25.75; 108 alloy, 23.25. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 22.50; grade 3, 21.50; grade 4, 21.00.

Brass Ingot: Red brass, No. 115, 27.25; tin bronze, No. 225, 37.00; No. 245, 31.50; high-leaded tin bronze, No. 305, 31.75; No. 1 yellow, No. 405, 22.75; manganese bronze, No. 421, 26.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.945, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.945, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 34.355; l.c.l., 34.98. Weatherproof, 20,000-lb lots, 35.55; l.c.l., 36.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $14.00-22.90; C.R. strip, $16.00-35.00; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.40-48.00
0.136-0.096	24-72	72-180	45.90-48.80
0.096-0.077	24-72	72-180	46.40-50.30
0.077-0.068	24-72	72-180	46.90-52.10
0.068-0.061	24-72	72-180	46.90-55.00
0.061-0.048	24-72	72-180	47.40-57.70
0.048-0.038	24-72	72-180	47.90-60.50
0.038-0.030	24-72	72-180	48.40-65.30
0.030-0.024	24-72	72-180	48.90-67.20
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-46	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100, 3003-F	44.60	50.90
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4*	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 base, 12 ft lengths

Diam	Round		Hexagonal	
(in.)*	2011-T3	2017-T4	2011-T3	2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.60
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 21.25-21.75; No. 2 heavy copper and wire, 19.25-19.75; light copper, 16.50-17.00; No. 1 composition red brass, 17.00-17.50; No. 1

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes
Copper	54.13b	51.36c	....	55.32
Yellow Brass	48.10	33.71d	48.39	52.26
Low Brass, 80%	50.65	50.59	50.94	54.71
Red Brass, 85%	51.54	51.48	51.83	55.60
Com. Bronze, 90%	52.98	52.92	53.27	56.79
Manganese Bronze	56.60	50.20	....	....
Muntz Metal	50.94	46.25	....	....
Naval Brass	52.86	46.67	....	57.02
Silicon Bronze	59.47	58.66	58.76	....
Nickel Silver, 10%	63.66	....	....	....
Phos. Bronze, A-5%	74.59	75.09	....	....

SCRAP ALLOWANCES e

(Based on copper at 29.00c)

	Clean Heavy	Rod Ends	Clean Turnings
Copper	25.000	25.000	24.250
Yellow Brass	19.250	18.375	17.375
Low Brass, 80%	21.375	21.125	20.625
Red Brass, 85%	22.250	22.000	21.500
Com. Bronze, 90%	23.000	22.750	22.250
Manganese Bronze	18.000	17.750	17.250
Muntz Metal	18.125	17.875	17.375
Naval Brass	18.000	17.750	17.250
Silicon Bronze	24.500	24.250	23.500
Nickel Silver, 10%	24.125	23.875	12.062
Phos. Bronze, A-5%	26.125	25.875	24.875

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

composition turnings, 16.00-16.50; new brass clippings, 14.25-14.75; light brass, 11.25-11.75; heavy yellow brass, 12.25-12.75; new brass rod ends, 13.25-13.75; auto radiators, unsweated, 12.50-13.00; cocks and faucets, 14.00-14.50; brass pipe, 14.50-15.00.

Lead: Soft scrap lead, 6.75-7.25; battery plates, 2.00-2.25; linotype and stereotype, 8.00-8.50; electrotype, 7.00-7.25; mixed babbitt, 9.00-9.50.

Monel: Clippings, 23.00-24.00; old sheets, 22.00-23.00; turnings, 16.50-17.50; rods, 22.00-23.00.

Nickel: Sheets and clips, 50.00-51.00; rolled anodes, 50.00-51.00; turnings, 39.00-41.00; rod ends, 50.00-51.00.

Zinc: Old zinc, 2.50-2.75; new diecast scrap, 3.00-3.50; old diecast scrap, 2.00-2.50.

Aluminum: Old castings and sheets, 9.00-9.50; clean borings and turnings, 4.50-5.00; segregated low copper clips, 11.00-11.50; segregated high copper clips, 10.00-10.50; mixed low copper clips, 10.50-11.00; mixed high copper clips, 10.00-10.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 10.00-10.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 13.50-14.00; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.00; clean borings and turnings, 8.50; segregated low copper clips, 14.00; segregated high copper clips, 13.00; mixed low copper clips, 13.00; mixed high copper clips, 12.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 56.00; light scrap, 51.00; turnings and borings, 36.00.

Copper and Brass: No. 1 heavy copper and wire, 24.00; No. 2 heavy copper and wire, 22.00; light copper, 20.00; refinery brass (60% copper) dry copper content, 20.50.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 24.00; No. 2 heavy copper and wire, 22.00; light copper, 20.00; No. 1 composition borings, 19.00-20.50; No. 1 composition solids, 20.00-21.00; heavy yellow brass solids, 15.00-16.00; yellow brass turnings, 13.50-15.00; radiators, 16.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.

Copper: Flat-rolled, 46.04; oval, 42.50; electrodeposited, 38.00; cast, 40.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 118.50; 200-499 lb, 117.00; 500-999 lb, 116.50; 1000 lb or more, 116.00.

Zinc: Balls, 18.75; flat tops, 18.75; flats, 21.50; ovals, 20.75, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.
Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.00; 2000-5900 lb, 13.00; 6000-11,900 lb, 12.75; 12,000-22,900 lb, 12.50; 23,000 lb or more, 12.00.

Nickel-Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 78.50; 100-600 lb, 69.20; 700-1900 lb, 66.40; 2000-9900 lb, 64.60; 10,000 lb or more, 63.30.

Stannous Chloride (Anhydrous): 25 lb, 153.80; 100 lb, 148.90; 400 lb, 146.50; 800-19,900 lb, 105.60; 20,000 lb or more, 99.50.

Stannous Sulphate: Less than 50 lb, 139.00; 50 lb, 109.00; 100-1900 lb, 107.00; 2000 lb or more, 105.00.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 87*)

areas of consumption are expected to provide substantial volume.

Plates . . .

Plate Prices, Page 77

Demand for specialties features the plate market. Buying of heads and flanges, stainless clad and alloy, is particularly noticeable. Sheared plates are moving slowly, with deliveries ranging ten days to two weeks. Floor plates are being offered more freely by distributors.

An estimated 21,420 tons of hull plates are required for six cargo vessels to be built for the United States Lines, New York, by Bethlehem's Quincy Yard. Eight shipyards bid for contracts. A government subsidy makes up the difference between cost at Quincy and the estimated cost of a comparable vessel built in West Germany.

CLASSIFIED ADVERTISING

Help Wanted

General Sales Manager

For Leading Eastern Steel Distributor

REQUIREMENTS:

(1) At least 3 years experience as sales manager or assistant sales manager—industrial metal product sales

(2) Proven leadership in training and directing salesmen and representatives

(3) Ability to plan sales objectives and take appropriate action to insure fulfillment

BENEFITS:

- Salary commensurate with experience
- Share of company profits
- Car and expenses
- All company paid benefits

Reply giving full history and salary requirements.
Box #899, STEEL, Penton Bldg., Cleveland 13, Ohio.

ENGINEERS
DESIGNERS

McKee offers permanent career opportunities to individuals qualified by experience to undertake the design of:

Steel Plants — Refineries
Sintering Plants — Chemical Plants
Pelletizing plants — Petro-Chem Plants

Remuneration commensurate with experience and ability.

Reply in confidence to:
G. VICTOR HOPKINS
ARTHUR G. McKEE & COMPANY
2300 Chester Ave. • Cleveland 1, O.

PROCESS ENGINEER

To work on development and research projects in investment casting foundry. Applicant should have experience in this field and educational background of chemistry and/or metallurgy. Send application with complete resume.

Casting Engineers
2323 North Bosworth Ave., Chicago 14, Ill.

Help Wanted

METALLURGIST

Metallurgist for aluminum permanent mold foundry in Colorado area. Experience in production of aluminum castings for the automotive industry. Require B. S. Degree in Metallurgy and practical aluminum experience, X-Ray and heat treating. Excellent growth opportunities, employment conditions, salary, and benefits attractive. Prefer man between 33 and 40 years of .. Send resume to Box 900, STEEL, Penton Bldg., Cleveland 13, Ohio.

SALESMAN TO COVER CHICAGO TERRITORY selling mill and heavy industrial overhead traveling cranes. Respond to Box 893, STEEL, Penton Bldg., Cleveland 13, Ohio.

DEFENSE COMPANY NEEDS
Top man to set up and run new Forging Dept., making all type plumbing fittings—Steel, Stainless, Brass etc. Must be able to lay out plant and recommend correct Presses, also Hammers to buy. Send resume of experience to Bill Martin.
C & E FORGING CORPORATION
1710 W. Florence Ave., Inglewood, Calif.

MOTORS • GENERATORS • TRANSFORMERS
ELECTRIC EQUIPMENT CO.
World's Largest Inventory
Call collect: CL 4-9058
P. O. Box 51 — Rochester 1, N. Y.

Positions Wanted

AVAILABLE—27 years Purchasing experience—20 of these in steel, handling total plant needs, raw materials, rolls, maintenance and fabrication. Some early experience in auditing and accounting. Now in Pittsburgh, willing to relocate. Reply Box 897, STEEL, Penton Bldg., Cleveland 13, Ohio.

FOR CLASSIFIED RATES
And Further information write
STEEL, Penton Bldg., Cleveland 13, O.

Princess Wenatchee, Chief Keokuk, and Junior,
Each have a favorite pig,
To which would you award the prize,
Small, Medium, or *BIG?*

When you think of SILICON . . . think of KEMCO!

KEMCO SILVERY PIG IRON

SILICON METAL—OTHER FERROALLOYS

Small . . . 12½ pound piglets
Medium . . . 30 pound pigs
Large . . . 60 pound pigs

Keokuk Electro-Metals CO.
Division of Vanadium Corporation of America
Keokuk, Iowa • Wenatchee, Washington

Sales Agent: Miller and Company
Chicago 4, Illinois, 332 S. Michigan Avenue
Cincinnati 2, Ohio, 3504 Carew Tower
St. Louis 5, Missouri, 8230 Forsyth Blvd.

The superior form of silicon introduction . . . available in 60 and 30 lb. pigs and 12½ lb. piglets . . . In regular analysis or alloyed with other elements. For uniform high purity, aluminum producers specify Kemco Silicon Metal.

Slightly heavier fabricated plate buying is reported by shipyards. Portsmouth, N. H., yard closes Jan. 24 on 22 alloy heads; 18 will be elliptical dished Hy-80 plates—a contract for two has been placed by the Navy Purchasing Office, Washington, with Lukens Steel Co., Coatesville, Pa., at $41,774.

Stainless Steel . . .

Stainless Steel Prices, Page 81

Producers of stainless steel tubing are facing increased competition from Japanese produced material in the domestic market. A Japanese interest is said to be planning to set up sales offices in Houston, Chicago, and Los Angeles. It already has an office in New York.

The Japanese firm, it's reported, will initially push the sale of Series 300 stainless tubular items in sizes ranging from ⅛ inch upward OD and will later offer high alloy and intermediate alloy tubing. Prices are said to be slightly below those quoted by U. S. makers.

Tubular Goods . . .

Tubular Goods Prices, Page 81

One important Pittsburgh area producer expects January bookings to equal December's, which was the firm's best month since early in 1960. Sales haven't climbed high enough to eliminate scheduling problems, but they've reached a volume that makes production planning a little easier.

Improvement is most noticeable in drill pipe, which has been in a dull market for months. Popular sizes of tubing and casing are moving out of downriver stocks at a good rate.

There's little business on books for February shipment, but the tubemakers figure customers are holding back orders until the last minute, knowing they can get shipments on short notice.

Kaiser Steel Corp., Oakland, Calif., has reduced prices on electricweld steel pipe $20 a ton. The cut applies on sizes 4½ to 18 in. diameter. Prior to the reduction, Kaiser's price was $26 a ton above that quoted in the Midwest. The reduction is thought to have been made to meet competition from Japanese pipe.

Youngstown area pipemakers say the outlook for pipe buying is im-

proving. Seamless and oil country goods are moving at a better rate. The pickup is largely attributed to depletion of consumers' inventories. Some improvement is expected in demand for line pipe, particularly electricweld, when the weather improves.

The number of active rotary oil drilling rigs in the U. S. fell to the lowest point in 14 years in the latest weekly report of the Hughes Tool Co. Active rigs in the U. S. totaled 1630, down 105 from the previous week, and 233 below the like week of 1960.

Distributors . . .

Prices, Page 82

Only a slight improvement in demand for steel products from steel service centers is regarded as likely this month. Bookings are in fair volume with no particular pressure in any product category. Sales of wire products, especially in the fence line, are fairly active due to seasonal factors. Structural steel, flat shapes, and tubular steel products are also moving in larger volume.

Part of the improvement in demand is attributed to a move to replenish inventories which were allowed to drop to low levels for year-end tax purposes.

Rails, Cars . . .

Track Material Prices, Page 80

An $11 million freight car facility has been opened by the Milwaukee Road at its Bensenville, Ill., yard. It provides for bringing cars to the workmen in a sheltered central area where all materials and tools are at hand. The four service tracks are equipped with two electric power winches to pull the cars.

Wayne A. Johnston, president, Illinois Central Railroad, told the Chicago Railroad Securities Club his road plans to trim its operating expenses $20 million this year. If that can be done, the line will show a 1961 net income of about $12 million.

He said the road's studies indicate its carloadings will be off about 100,000 cars, or about 6 per cent. The railroadman thinks there may be a few more slow months, but then orders for new materials should again begin to flow.

Advertising Index

Abell-Howe Co. 9
Aetna-Standard Division, Blaw-Knox Co. ..... Inside Back Cover
American Chain & Cable Co., Inc., Wright Hoist Division 40
Armco Steel Corporation, Armco Division 2, 3
Automotive Gear Division, Eaton Manufacturing Co. ..... Inside Front Cover

Bethlehem Steel Co. 1
Birdsboro Corporation 39
Blaw-Knox Co., Aetna-Standard Division ..... Inside Back Cover

C & E Forging Corporation 91
Carpenter Steel Co., The 30
Chambersburg Engineering Co. 66
Cincinnati Milling Machine Co., The, Meta-Dynamics Division 29
Cone-Drive Gears Division, Michigan Tool Co. 71

Damascus Tube Co. 8
Drever Co. 59

Eaton Manufacturing Co., Automotive Gear Division ..... Inside Front Cover
Electric Equipment Co. 91

Great Lakes Screw Corporation 15

Heresite & Chemical Co. 36
Houghton, E. F., & Co. 20

International Nickel Co., Inc., The 16

Keokuk Electro-Metals Co., Division of Vanadium Corporation of America 92

McKee, Arthur G., & Co. 91

Mesta Machine Co. 61
Michigan Tool Co., Cone-Drive Gears Division 71

New England High Carbon Wire Corporation 43
Northeast Ohio Machine Builders, Inc. 69

Oilgear Co., The 7

Republic Steel Corporation 18, 19
Ryerson, Joseph T., & Son, Inc. 10

Square D Co. 89

Timken Roller Bearing Co., The .... Back Cover

Udylite Corporation, The 35

Vanadium Corporation of America, Keokuk Electro-Metals Co. Division 92

Ward Steel Co. 6
Welded Steel Tube Institute, Inc. 4
Wright Hoist Division, American Chain & Cable Co., Inc. 40
Wyman-Gordon 50

~ ~ ~

Table of Contents, Page 13

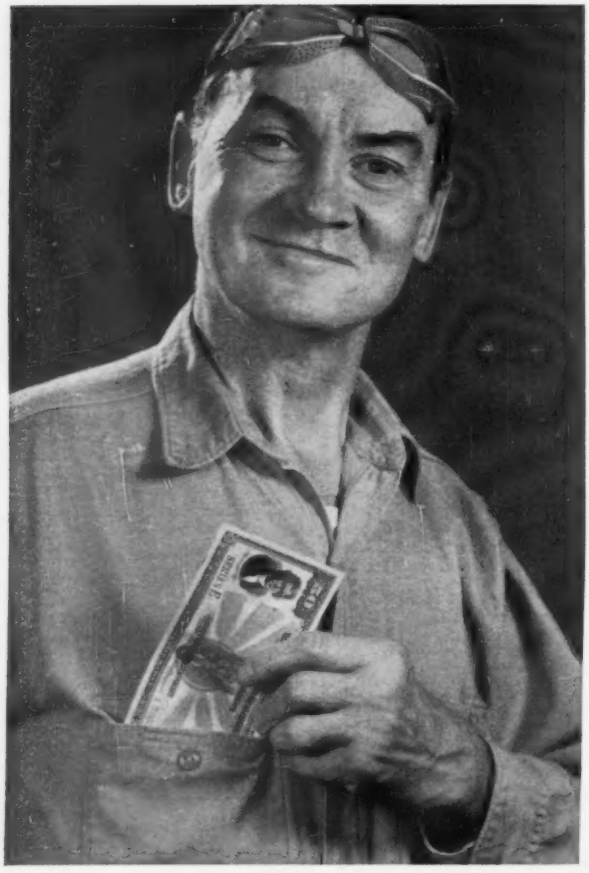
Classified Advertising, Page 91

TO FIND THE MAN YOU NEED . . .

Place an advertisement in the "Help Wanted" columns of STEEL's classified pages. Your advertisement will reach the qualified men you need, because STEEL is addressed to highly-trained men in all phases of metalworking.

STEEL
The Metalworking Weekly

How 45,000 companies help their employees buy security



45,000 American business firms have put in a valuable service for their employees—the Payroll Savings Plan for U.S. Savings Bonds. Through this plan the company payroll clerk sets aside a certain amount for each participating employee, each payday. Bonds are delivered to employees as soon as they are fully paid for. It's fully automatic, and the easiest way in the world to save.

More than 8 million employees are using the plan, and are saving about $2 billion in Savings Bonds a year. These funds have helped buy homes, finance vacations, assure college educations and provide nest-eggs for retirement.

If your company has not installed the Payroll Savings Plan thus far, contact your State Savings Bonds Director and have him show you how the Plan works. Get his experienced help in presenting the Plan to your organization. Or write Savings Bonds Division, U.S. Treasury Department, Washington, 25 D. C.

Hats off to American Industry!

"American Industry—by promoting the Payroll Savings Plan—has given the Savings Bonds Program its greatest success," says William H. Neal, National Director of the Treasury's Savings Bonds Program.

ALL U.S. SAVINGS BONDS—OLD OR NEW—EARN ½% MORE THAN BEFORE

20th ANNIVERSARY 1941 1961

STEEL The Metalworking Weekly

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTISM, THE ADVERTISING COUNCIL AND THE DONOR ABOVE.

Automatic Bull Block

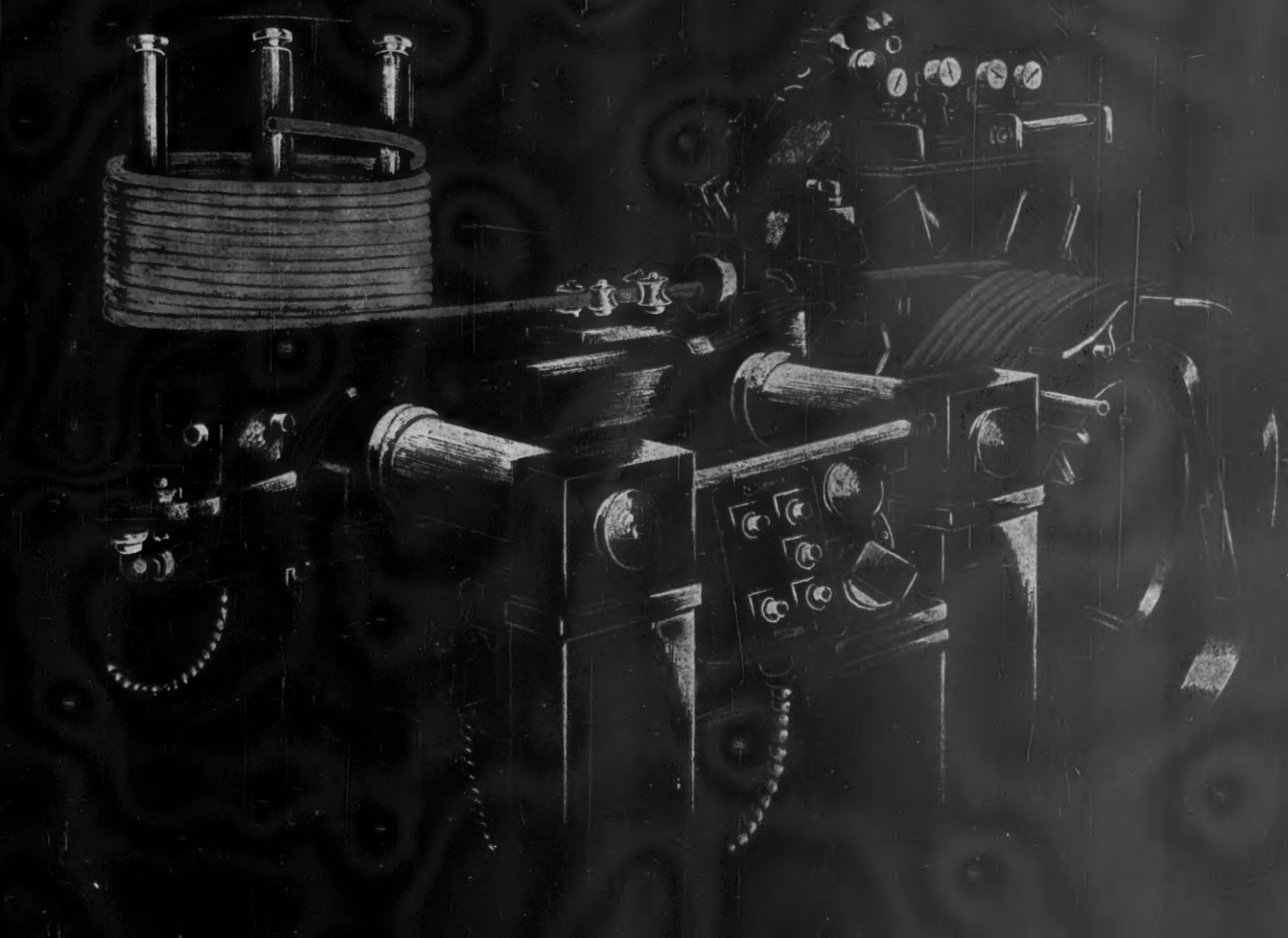
for copper

Place coil in tray and feed point into die. Press the button, that's all. This Automatic Bull Block does the rest. Finished tubing emerges. Features include Automatic Gripping, Automatic Grip Release, Heavy Traverse Feed.

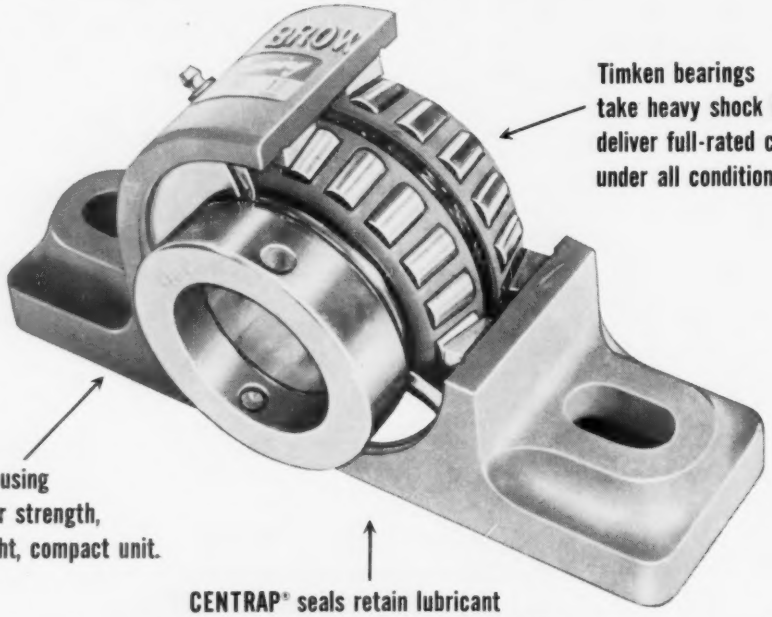
This is a 36" Bull Block drawing down copper from 5/8" to 1/8" at high speeds.

The Automatic Bull Block can be furnished in all sizes up to 84" diameter. Producing long lengths at high speeds automatically really brings down those costs. For complete information on the Block or any other Cold Draw equipment for tubes, bars, or shapes, write to: Cold Draw, Aetna-Standard Division, Blaw-Knox Company, Pittsburgh 30, Pennsylvania.

Aetna-Standard Division
BLAW-KNOX



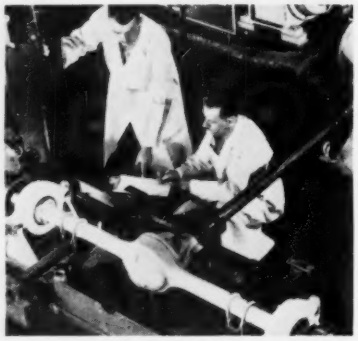
Browning malleable housings team up with Timken® bearings for greater capacity and strength



To be sure their PB900 pillow block has maximum ability to take heavy loads, Browning Manufacturing Company, Maysville, Kentucky, uses a malleable housing and Timken® tapered roller bearings. The malleable housing permits a stronger yet lighter, more compact unit. The Timken bearings provide higher load-carrying capacity and longer life in minimum space—more than any other type of bearing.

It's the tapered design of Timken bearings that enables them to take *both* radial and thrust loads. Full-line contact between rollers and races and precision manufacture give Timken bearings *extra* load-carrying capacity. And they're made from the finest bearing-quality alloy steel available to withstand shock.

OUR ON-THE-SPOT ENGINEERING SERVICE saves customers time and trouble. Our graduate engineer salesmen help you select the most economical bearing for your job.



TESTING FACILITIES in our modern laboratories help us solve customer bearing problems—develop new bearings just as we did for Browning Manufacturing Company.

Industry rolls on

TIMKEN®

tapered roller bearings

The Timken Roller Bearing Company, Canton 6, Ohio. Cable: "TIMROSCO". Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits. Canadian Division: Canadian Timken, St. Thomas, Ontario.